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"THE MAN AND THE ANT."

THE above title is not intended as a plagiarism on our old friend Æsop. 1 is meant only to indicate the warfare which has raged from time immemorial between the most intelligent of mammals and almost the smallest—albeit the most highly gifted as to mental power—of the insect tribe. In that warfare man, with all his great gifts of intellect and his vastly superior strength, has been heavily worsted by his relatively insignificant opponent. There are few of us, we imagine, who can fail to share Sir John Lubbock's appreciation of the extraordinary capacity of our tiresome little enemies, for as such we are certainly justified in classing the ant tribe. It is unfortunately the case that in all tropical countries—and in none more so, we should say, than in Ceylon—the opportunities for observing and for appreciating, —after a left-handed fashion,—the qualities of the ant are particularly and regrettably wide. They invade our meat safes, they disturb us in our beds and even extort cries of pain from us when met with in their jungle habitats, and they cap all their aggressions upon their human foes by eating our houses over our very heads. Truthfully may it be said that hitherto no adequate, inexpensive remedyas b een devised by which the balance of advantages now so largely in favour of the ant may be redressed in our favour. In spite of all attempts, of the many suggestions which have been put forward, the little insignificant-looking insect continues master of the situation, and daily, in one form or other, makes us feel his power. Has not the so-called ant of the white epidermis almost succeeded in eating a whole Colony—that of St. Helena—practically out of house and home, and rendered it at one time a matter of serious consideration whether it would be practicable for Great Britain to remain the tenant of that isolated island! We know that the ravages of the white-ant not many years ago, did render such an evacuation within the "range of practical politics," and all methods of treatment tried in other Colonies have failed to keep under this ravaging little intruder on domestic comfort.

We are, therefore, inclined not altogether to pooh-pooh a suggestion offered to us as to a possible method of largely exterminating these little pests which has at least, so far as we know, the recommendation of novelty. It is known that a low range of temperature is as fatal to insect life as a higher range is to its production and maintenance. The numbers in which ants swarm, and the extent of their wonderful subterranean galleries, render it most difficult to reduce their numbers. To get at the "Queen Ant" without the destruction of which all efforts at exterminating are fruitless, is a work often of great labour, and very frequently is wholly unsuccessful. Chemical solutions, to be used in the large quantities necessary, are costly and sometimes difficult of application. Well, it is now suggested to us that we might *freeze* our foes out of existence in the neighbourhood of our dwellings! We have heard how quicksands are now passed through, in excavations, by the use of freezing mixtures which suffice to turn the moisture of large cubes of soil into solid blocks of ice. The idea now is that a cask of such freezing mixture should be fixed over the main entrance to an ants' nest—the others being closed up with clay, as they become apparent—and that a tube from it should be placed into the hole and also well "luted" with clay. The pressure due to the head of liquid in the cask would suffice to drive the freezing mixture into the inmost recesses of the galleries, and these, it is expected, would almost instantly become lined with solid ice, or at all events would have such intense cold produced in them that no ant, however tenacious of life, could long survive exposure to it. Such freezing mixtures are, we are told, exceedingly cheap—they could not otherwise be used on the large scale they now are in engineering operations—and it may be found that the progress of science in the latter part of the nineteenth century has achieved a victory for which so many past generations have contended though in vain.

WATER IN LANDSCAPE GARDENING.

From an article so headed in the American periodical *Garden and Forest* we quote a passage, which we commend to the notice of those responsible for the upkeep of the pretty grove and sward in "Victoria Park" in which the Band of the Volunteers plays once a week. The fountains in the "Gordon Gardens" prove how greatly water in motion adds to the attraction of a pleasure ground. A nice fountain and fernery with a *Victoria regia* tank would give fresh beauty to a spot already beautiful in "Victoria Park." The amount of water required would not be large; and much of it, by proper arrangement, could be used over and over again. Daniel D. Slade writes:—

"Where the supply is limited, a weeping fountain' which consists of an upper basin into which the water is brought with just sufficient volume to overflow on every side into a large basin below, is perhaps to be preferred. By carrying the pipe to a level with the outer edge of the upper basin the water may be thrown a little above the surface in a jet, or it may be allowed to boil up in the basin. In material and design such a fountain may be infinitely varied. An inexpensive arrangement was carried out in this way. The vase, or upper basin, was formed of an irregular shaped block of freestone, nearly circular and some three feet in diameter. This was supported upon three blocks of the same kinds of stone placed with apparent carelessness one upon the other, the lowest resting in the centre of a lower basin, which was circular and some five feet in diameter. The blocks were drilled for the passage of the conduit pipe and the whole was rough-hammered. The spray of the water which dripped from the upper basin quite sufficed to moisten the ferns and aquatic plants set about its base and the colour of the freestone was quite in harmony with its surroundings."

CEYLON UPCOUNTRY PLANTING REPORT.

THE WEATHER AND PLANTERS' WARDROBES—THE 'TROPICAL AGRICULTURIST"— A NEW DEPARTURE—PRICES FOR CACAO AND CACAO CROPS—COFFEE—TEA—LABOUR.

September 15th.

The continuous rain we are having is rather monstrous, and is trying the capabilities of the planter's wardrobe. The wet clothes accumulate; for the green firewood in the kitchen—and whoever saw any other kind than green firewood in wet weather—can't keep up with the armfuls of splashing "duds" that require to be dried and which are handed back in the morning, warm but moist, and decidedly redolent of wood smoke. With rain night and day, even a good stock of clothes soon gets all wet, and it was not a matter of any surprise to me when I heard that in one district the indoor rig of the planter is at present the dress suit! To the stranger visiting, this style of things would give an idea of there being a high standard of civilization abroad, and doubtless there is; but that it should blossom at this time, and so generally, would be puzzling to account for, but for the weather. All the same: a planter with a healthy appetite does not mind much even if he has a swallow-tailed coat on at breakfast, and sits down to his solitary dinner in full evening dress.

The *Tropical Agriculturist*, which keeps up its character as a practical and thoroughly useful planter's magazine, is certainly improved by having had of late its edges cut at the publishing office, instead of leaving that to the reader. It is a small matter of course, but it is a comfort all the same. It stumps the critic who only cuts a page or two, smells his paper-knife, and then proceeds to review! Besides this it is evident that the publishers keep abreast of the times, and in small matters as in great are bent in doing all they can for their readers.

The September number, which is before me, is as full of information as any of its predecessors, and the sweep of the editorial net is about as extensive as it possibly can be. Except that it would take up too much space, I would like to jot down all the sources from which the information in its pages have been drawn. To do this one would have to begin with *Punch* and the London *Times*, and end up with the *Japan Weekly Mail*.

Cacao planters, who have of late been realizing the handsome figures of 110s to 115s for their produce, do not quite appreciate the decline in rates, albeit 100s per cwt. for "bright bold" is still a very good price. I am told from home that the absence of American buyers from the market is one of the reasons for the fall, and the big gap between the West Indians and our own is perhaps another. Cacao, too has better prices in the winter months, somehow, than obtains at other parts of the year; so it is to be hoped that ere the bulk of the crop goes home prices may strengthen. I do not know of any produce in the island which has its gingerbread so thickly gilt as a good cacao garden: but that makes it all the harder to bear when some of it comes to be rubbed off. It is like the widow and her mite; where one is so "down on his luck" as *that*, to part with the coin is easy; the difficulties and trials come in when you have more.

Cacao is looking wonderfully well, and all that I have seen promises a decent crop. Already fair gatherings of pods are to be had, but better tasks will be selected later on. The Moormen who were so anxious a few months ago, to buy up any black rubbish in the shape of cacao that could be got are "easing off" and want now to be tempted. Perhaps their little game of improving the colour by means of the annatto dye may be played out, and they may be considering what next honest employment to turn to.

There is a sprinkling of ripe coffee about, which will need a good price for its parchment to pay for the gathering. "Still, there is more to follow"; and the trees seem as if they would run through the season, and not be very much the worse of it at the end. A nursery of Coorg coffee which I saw the other day, had come up very well, but there was leaf-disease on it pretty bad, although it might have been worse.

A good deal of tea is cut down just now, and the flushing is nothing to boast of. Some of the districts which are cold and wet are anxiously waiting for the genial sunshine, which has not been seen since June or July, so as to encourage the flush and put life into the coolies. The tea-house working at half time is never a very paying concern, and a good many have of late had to be content with that.

Coolies are sufficient, and more, for the planter's wants, and seem rather to enjoy a short time of enforced idleness. If Ramaswamy has been working steadily before, he is like a man who has lost his sleep, and has a good deal of resting to make up. That he does with pleasure, and both the planter and cooly are content.

PEPPERCORN.

NOTES ON POPULAR SCIENCE.

BY DR. J. E. TAYLOR, F. L. S., F. G. S., &c., EDITOR OF "SCIENCE GOSSIP."

A French chemist, M. Aimé Girard, has drawn special attention to the employment of copper salts as a remedy for the potato disease. The notion is not new, for Dr. Griffiths published his own experi-

ments with both copper and iron salts as a manurial remedy for the same diseases, and the fungoid diseases of cultivated plants generally, nearly two years ago. M. Girard, however, shows that a solution of sulphate of copper used as a preventive of the potato disease is not only very efficacious, but that it results in a gain to the crop such as more than pays for the expenses of the treatment. Even when used as a purely curative agent, he says the yield of healthy potatoes is increased from between twenty to twenty-three per cent.

It has been found that when leaves, or rather plants, are grown in unhealthy situations, such as where there is a deficiency of light or nutriment, the green chlorophyll becomes degraded in its functions, and assumes another colour indicative of this fact. The commonest of the degraded colours of leaves is some high tone of yellow. This is due to the presence in the cells of carrotene, instead of chlorophyll. Moreover, our orange and deep yellow autumn tints are due to the change of the latter into the former.

Somebody spoke of the present as the "age of iron," until a recent writer termed it the "age of steel." But wood is not yet disused, although as regards house-building it is no longer an "age of timber," builders having discovered with how small a quantity of wood a house can be built. But wood is not timber, although many people confound the two. Tree ferns and palm trees have large woody stems, but nobody uses them as timber. They would rot directly.* The simple structural forms of timber are coniferous trees, such as larch, pine, &c. They possess the loosest tissues, which soonest decompose (in spite of their natural turpentine), and consequently are much employed under certain conditions. In them the woody bundles run the length of the stem, and produce "grain;" but we do not find in the structure of such timber the horizontal bars of wood we see in a section of oak, ash, beech, &c. The real timber trees were those used by our forefathers in the old-fashioned houses, built when real timber was as abundant as "wood," so they helped themselves to it, as the beams and rafters of our old houses prove. The oak and ash and other real "timber trees" are built up naturally into a solid woven fabric, consisting of vessels and woody bundles running lengthways of the trees, whilst such extra additions as the "medullary rays" (absent in cone-bearing trees) are interwoven into them from the core to the bark. Generally they increase at the rate of one added ring of growth per annum, but this is not necessarily so, especially in young "timber trees," in which the rings represent merely a fresh spurt of growth, annual or otherwise. The seasons are now known to exercise a wonderful influence upon the nature of the rings of woody growth added in the older timber trees annually. We have dry summers and wet ones. Nobody can prophesy (until afterwards) which will be the case. It is only in summer, when the leaves are crowding the trees, that the timber of the woody trunk can grow exogenously. Therefore it is evident the nature of that growth must largely depend on the character of the season. One of the worst things which can happen to wood (considered as "timber") is when there has been a succession of dry seasons followed by wet ones. During the latter the tree forms what is known as "weak wood"—so weak, that not unfrequently, as the growth progresses outwardly, it is detached at the weak part of the ring from the previous growths. This is technically known as a "ring-shake." Coniferous trees can grow on scanty soils. They are the oldest trees in the world, geologically speaking, and are used to the poor soils of a primeval world. Oaks, beeches, ashes, &c., are among the latest introduced of trees. They cannot live on a vegetable pauper diet, but require the rich subsoils of the latest geological formations—clay, marl &c.

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* Dr. Taylor had in view the general run of palms. There is no better timber for rafters and reepers of house roofs than that of the palmyra palm, while selected coconut trees are good for similar purposes. —ED. *T. A.*

It is a well-known fact that the more we cultivate any particular crop the greater is the number of diseases to which the latter becomes liable. Is it due to overcrowding—to increasing the individual plants we denominate a "crop"? The potato disease was hardly known until Ireland scarcely grew anything else but potatoes. Vine diseases (animal and vegetable) have accumulated with extended vineyard planting. It is the same with orchards, olive-yards, orange-groves, &c. The cultivation of oranges all over the warm temperate parts of the world has mightily increased within the last few years. People have learned to love them, and increased transit has brought the producer and consumer nearer together. Oranges are no longer the sole luxury of the rich, and the objects of envious desire to the sick poor. But with increased cultivation have come increased diseases to the fruit. They are attacked by blue and green moulds, which destroy nearly half the quantity that arrives in Great Britain. They are also subject to extensive ravages by a peculiar species of small fly, whose pupa-cases may be seen embedded in the outer skin of most oranges by thousands, looking like so many carraway seeds. The name of this minute insect is *Ceratitis citriperda.* Recently another entomological enemy to the orange tree has been discovered in the larva of a beetle (*Cerambyx meles*), which bores into the lower part of the stem and down into the roots. This grub seems to be either identical with, or nearly allied to, the *Cossus* of the ancient Romans. A species of *Praya* has also this year been found feeding in the buds of orange and lemon trees in the south of Europe. Let Australian orange-growers, therefore be on the look-out for this new arrival of enemies.

Microscopy has done a good deal for practical and technical science, and it promises to do a good deal more in the future. An interesting paper has just been read before the French Photographic Society on microscopic sections of wood. The French Inspector of Forests pointed out that such photographs permit the trees which furnish the woods to be classified, owing to the microscope bringing out the structure of the cells and fibres, so that thin cuttings of any wood can be compared with standard photographs so as to enable them to be identified at once.

Messieurs Gayon and Dubourg have been exploring the mysteries connected with the important subject of the alcoholic fermentation of inverted sugar, and have laid the results before the French Academy of Sciences. In brief, the following are the conclusions they arrived at. They followed the progress of the fermentation by means of the polarimeter, and they prove that the two components of invert sugar are attacked with different degrees of rapidity, and that different ferments do not act in the same manner; some attack the lævulose by preference, and others the remaining componen

At the risk of repeating what you may have already heard of, I do not hesitate to give the following important bit of news connected with the banana plantations. The discovery was made accidentally in Fiji—the paradise for Australian bananas. There can be little doubt the discovery will prove valuable in all tropical countries where bananas are cultivated.

The banana disease had broken out virulently on a plantation at Vanua Levu. Near the seashore a banana patch was very much diseased. Some time ago the sea broke over into it, the salt water remaining there for about an hour. All the plants were killed as far as the standing stems were concerned; but vigorous young shoots came up freely from the roots, and were not only quite free from disease, but soon began to bear much larger bunches of fruit than the parent plants ever did. The planters noticed this effect, and immediately tried an experiment upon a number of diseased bananas which the water had not reached. They cut down the diseased plants, stirred the ground about them, and then poured three or four buckets of sea-water about each plant. The parent stems withered, but vigorous young shoots sprouted in their place without a sign of disease.

The question of a scientific investigation into the aeration of soils must commend itself to all agricul-

turists. The French chemists have long been to the front in the investigation of matters of this kind, although their English brethren are fast overtaking them. M. Schloesing has been experimenting in the matter, and has recently made known his results. He shows that ploughed land contains a relatively larger amount of oxygen to a certain depth. The carbonic acid generally increases with the depth, but in two cases the reverse occurred. This was when a high wind renovating the upper soil had been followed by hot and calm weather. Then more carbonic acid gas was generated in the surface soil than in the subsoils. In sloping pastures the most carbonic acid gas was found at the bottom.

At the recent annual meeting of the Society of Americon Microscopists an interesting paper was read by Dr. Thomas Taylor, on the adulteration of tea. Can any philospher in the world explain why a man's drinks should be more liable to adulteration than his solids? Perhaps it is because he takes more of them. Therefore, both drinkers, and teetotallers, are hereby liable to the same imposition. Dr. Taylor showed how Japanese teas are "faked" to resemble the Chinese green teas, the materials used in the process being indigo and plaster of Paris. It so happens that this is the kind of tea the Yankees prefer. Neither of the adulterants is harmful, only there is no necessity to drink tea with any other adulterants than cream and sugar. The Japanese are a wise people, and by them coloured tea is regarded as an abomination. He taught that a return of the consumers of teas to Japanese habits would certainly result in the preparation of the tea-leaves in Japan, and would thus afford cutomers better teas at lower prices.

At Keswick, in our well-known lake district, there is now taking place the first essay in England to utilise natural water power of the hills for the purpose of public electric lighting. The river Greta supplies the motive power. About three-quarters of a mile from Keswick town it has a head of twenty feet, and this has been selected as the site for the works. The light has been received with much favour, and already the demand is equal to the supply. One man and a boy have been found sufficient to manage the machinery.

The oil wells at Baku, at the Caspian, are said to be drying up again. Out of four hundred wells less than two hundred are now working. This may cause much incovenience to the Russian navy on the Caspian, many of whose vessels have been specially fitted up to consume petroleum. If the world's supply of coal is limited, and will only last a certain time, it is very certain its mineral oils are more limited, and will be exhausted in a much shorter period. The craze for oil-well boring cannot be too carefully watched.

Another well-known French chemist, M. Muntz, has published his experiences on the part taken up by green manures as nitrogenous dressing for soils. His experiments show that the efficacy of green manures as nitrogenous dressing materials depends especially on the facility with which the fresh vegetable matters allow the nitrification of the proteids, and on the favourable influence they exercise on the physical properties of soils.

A singular confirmation of the theory that certain kinds of insects have become specialised to visit certain kinds of flowers or rather that the latter have been specially adapted to the former, has just been proved by a German botanist. The highest organised and specialised of the numerous members of the buttercup family (Ranunculaceæ) is the aconite. On the other hand, it is granted that the bees are, perhaps, the most highly cerebrated of insects, and know their way about. It has been shown there is a biological relationship between the aconite (Aconitum) and a genus of bees (Bombus). The aconite is dependent upon this bee for fertilisation. On comparing the geographical area of the two it has been found that the area occupied by Aconitum is entirely covered by the area of distribution of Bombus.

You in Australia know what it is to disturb nature's zoological balance by your rabbit pest. They are suffering from a similar disturbance in the Southern States of America. The alligators have nearly all been killed off for the sake of their hides, which are manufactured into a special kind of leather. It seems the alligators are the specific foes of the musk-rats, which have multiplied accordingly since the almost complete extermination of their natural enemies, insomuch they are now a great scourge to the farmers in Louisiana and elsewhere. The consequence is that a fine of 24dol. is now imposed upon any one who shall slay an alligator.—*Australasian.*

A TEA PLANTER'S ROMANCE.

In "The Dead Man's Gift: A Tea Planter's Romance," just published by Messrs. W. H. Allen & Co., Mr. Herbert Compton has written a capital Anglo-Indian novel, dealing with a phase of English life out here that has scarcely been attempted before. The plot is ingenious and exciting, the scenery is admirably described, and the characters are wonderfully lifelike. With the plot we need scarcely concern ourselves here; it will be enough to know that a very pretty love story and an atrocious scheme of commercial villany are gradually revealed in a novel and picturesque frame-work of Himalayan scenery. The interest of the book from our point of view lies rather in its characters, vivid enough to be transcripts of actual individuals, and in its faithful, unvarnished descriptions of tea-planting life. Dennis Durand, the central Tea Planter of Mr. Compton's romance, is a frank, straight-forward young University man, who after having had a good time at home invested what he had left, some four thousand pounds, in a tea garden at Dulgoorie (for which perhaps Darjeeling may be read), and then proceeded to learn the business. A kindly neighbour, old Pekoe Puckle, fortunately took him in hand. When Puckle first came to Dulgoorie, the process of tea manufacture was a Mystery tempered with Ignorance. The manufacture of the leaf was in the hands of a few Chinese charlatans, who had been imported from the Flowery Land, and distributed over the new tea districts to disseminate a knowledge of their reputed craft. They concealed their ignorance under a cloak of pride and impenetrability, and did all their work in carefully secluded corners. Puckle put them down as gigantic humbugs, and evolved a process of his own that gave his teas a very profitable price. Unlike most of the old-fashioned tea-planters, he was always ready to give everyone the benefit of his experience:—"The sooner we can all make good stuff," he would argue, "the sooner we shall sweep the rubbish from China out of the market. It's bound to go if we pull together." Strolling for five minutes through a friend's factory, he would point out all the errors and mistakes he noticed, and rectify them at once. The smell, the colour, the look, the touch, the feel of the leaves in the process of manufacture told him everything at a glance:—"In short, he was a Tea Expert." Things, we are told, have altered since those remote times when the sixties were young:—"Everything is done by machinery in a tea factory nowadays, and Puckle's tea-house operations slowly and laboriously, and it is to be feared dirtily, performed by hand by a large staff of specially drilled coolies, can now be conducted by half a dozen intelligent men in charge of a variety of withering, rolling, drying, and sifting machines and with a facility and precision and cleanliness which would crumple up some of the old dead-and-gone pioneers of the industry, if they could rise from their graves to resume temporary management of their factories." "Don't imagine, Durand," Puckle would often say, "that any fool is fit for a tea-planter; that is an exploded idea now amongst men of business, who know what tea-planting really is. You want more wits and versatility in our profession than in most. You must not only be Jack of many trades, but master of them. The programme for a successful season is a big order for any one to buckle down to." We are pilfering wilfully from Mr. Compton's volume, as the

best way of showing its excellence, and, indeed, it would be easy to fill a column or two with the apt things he says of that famous expert Pekoe Puckle.

Puckle, we are told, was a capital tea-taster, with a fine vocabulary of technical expletives and adjectives. Thus the samples on which be pronounced came to be described as "handsome, curly, glazed, bright, black, wiry, glossy, even, regular, tippy, and curious in appearance; whilst their drinking qualities were reported on as strong, flavoury, full, rich, ripe, brisk, fruity, thick, fine, creamy, pungent, malty, sweet, good, high-fired, brisk, burnt, rasping, desirable, clean, and superfine. But others would occasionally disgrace themselves and sink into the turpitude of being dull, broken, dusty, flat, choppy, chaffy, uneven, crapey, mixed, round, shotty, stalky, grey, red, brown, greenish, dull, black, and tipless in leaf; whilst in liquor they were branded as soft, weak, burnt, scorched, coarse, thin, extra thin, undesirable, wanting flavour, wanting quality, wanting briskness, bakey, toasty, poor, and bad." In sad contrast to Pekoe Puckle we have Jack Boyce, an Oxford Man and old Etonian:—"He's the kindest-hearted man in Dulgoorie, and the weakest in a way. He has run through a fortune and has one foot in the grave, and yet he passes his life in keeping open house for the district and passing the bottle round. It is the old story, of course, lifting his little finger too often." His bungalow was popularly known as the *Red Lion*, and was open night and day "of man and beast." Durand tried to rescue him from the toadies and harpies who flattered his failings and used his house as an hostelry, and was, as a consequence, sent to Coventry by the planting community as a body. Boyce came, of course, to "the six-by-two freehold in the planters' churchyard;" and with his pathetic death the better men among the Dulgoorie planters began to respect the energy, independence and character displayed by young Durand in his single-handed combat against the evil influences of the district. His warmest supporter was a half-pay lieutenant of the old Indian Navy—Lieutenant Marling, a quaint, crabbed, old salt, who wasted his half-pay in trying to grow tea so bad that even the tobacconists would no buy it for packing cheroots in. Durand came across the Lieutenant first, as the old man, in a voice broken with sobs, was reading the Burial Service on a grave dug in the middle of a grim, fantastic landslip:—"Do you know," asked the Lieutenant, "can you guess over whom I read the funeral service just now?" "No." "Then I'll tell you, for it's my duty. It was over a native woman. A heathen, if you will, but my wife, Sir—before Heaven my wife—even though she and I were never married. Perhaps"—he went on in a softer tone—"perhaps I have done wrong. Maybe I have led you into an act which is against your religious principles. She had no right, a parson might say, to the services of the Christian Church, even though she prayed to the Christian's God. I say she had. But, then, I loved her. And believe me, Sir, I meant no harm." This strange meeting led to a singularly devoted friendship. Lieutenant Marling is so happily conceived that we feel quite sorry when his eccentricities are, however amusingly, exaggerated; as, for instance, when Durand recognized the familiar voice of the Lieutenant outside his bungalow:—"Starboard you Lubbers!" Then after a few seconds—"Port your hellum—hard-a-port!" They had reached the bungalow. "B'lay! B'lay! Easy! Stand by!" And finally—"Le' go!" alluding doubtless to an anchor. "Le' go" they did—a trifle too promptly. "Darn the lubbers!" roared a crushed voice from within, as a movement in the canvas ceiling of the palanquin was suggestive of a head being unexpectedly shot into it from below. "Darn the lubbers! She's gone aground!"

Lieutenant Marling's funeral service, however pathetic, hints at something amiss in the tea-planters' little circle:—"The greatest drawback of all," we read, "in a tea-planting community in those days was the want of woman's presence and influence, and it lowered the whole standard of morality and refinement, and made the school a bad one for a young man to enter, and full of vicious temptations to which many a lad, just out from home and a refined family circle, yielded, and so went to the bad." The ladies of Dulgoorie in those days were a mixed lot:—"Some were civil without being attractive, and one or two went in for being very superior; whilst others dropped their 'h's,' or wore loud colours, or drove niggers, or did divers things which individualised them unpleasantly, so that in their presence Durand had asserted himself, because he felt that to be shy before them was a sort of surrender of his social status. And then they all talked TEA." Durand happily, and almost by accident, stumbled across a most bewitching little lady, Sibyl Adair, as she was giving her brothers, Isaac Newton and Colenso, their morning lesson. Her father, Mr. Lionel Adair, had been a mathematical tutor at Cambridge, and had had a mathematical bee in his bonnet ever since:—"I am engaged," commenced Mr. Adair, "in a work of Considerable Depth. A Treatise on the Higher Mathematics. It is an Absorbing Task." He might have said it was a Screaming Farce, if it were not that this wretched Work that was to be, had ruined the whole family. When Mr. Adair went to look round the factory he would take up the lid of a tea chest, and work out problems on it with a piece of charcoal; and if he went into the Plantation to inspect the coolies, he would sit down on the first convenient bank and sum out something on the back of an envelope:—"No wonder that the men were getting idle and lazy, and that the fat Jemedar, or native overseer, was nothing more or less than the master of the estate instead of its servant." And the tea sold badly, and there was so little of it, and it was stolen right and left. Little Miss Sibyl—she was barely seventeen—had the cares of a large family on her hands, and did a good deal, too, to prevent the tea-garden going to the dogs. Durand sympathized with her struggles offhand:—"Oh, Mr. Durand," she exclaimed, "you don't know what you are saying! Papa will never leave this place. He is getting deeper and deeper in his Work every year, and has not the slightest inclination for change. When Mamma was alive she made him come out of his shell, but since she died he has had it all his own way with those—those—those *beastly* mathematics!" Of course, these two inexperienced young people fell in love with one another at once, and their chequered love-story is told tenderly and very prettily. It is in its way a delightfully bashful and idyllic incident. The subsidiary characters are as good and true to life as those we have picked out. Captain Goad a bully and a coward, who swaggers on his title, talks of the "Service," and avoids mentioning the regiment in which he was broke, must have been a familiar type in the old planting days. Mr. Louch, of the firm of Cumming, Jones & Co., Tea Agents, and inventor of the Big Tea Amalgamation Scheme, is probably still remembered in Calcutta. Even at this geographical distance some of the details of his career seem familiar, though we do not suppose that, before bolting from Calcutta (or Jutepore), he ever sold his famous carriage and pair ten times over, or that he ever actually bought Durand's tea estate for a lakh of rupees worth of forged shares, and then branded Durand as the forger. For the plot of the story our readers must go to the "Tea Planters' Romance" itself, and see there how "The Dead Man's Gift" put Lieutenant Marling's twenty-acre estate in the middle of that Golgotha of stone and desolation, the Landslip, into Durand's hands, and how mysteriously Durand was directed to the discovery in the Landslip of some odd hundred-weights of rough, but enormous, sapphires. These wonderful stones set everything right. It is a real pleasure to congratulate Mr. Compton on a book that, coming from any recognized English novelist at home, would have won success as a remarkable effort of imagination. As Mr. Compton knows what he writes about, he must, we suppose, be content to think that he has told his own experiences in his own way and an admirable way it is. If his tea is only half as good as his book, Mr. Compton should, however, have no reason to grumble. He was boycotted at Mincing Lane, if we remember rightly, for selling his teas in an original way. His old enemies will find it difficult to boycott his book. It is a right good "chop."—*Times of India.*

FIBROUS PLANTS AND THEIR TREATMENT.

A factory has been established in High Street, Lambeth, under the supervision of Mr. Taylor Burrows, late of Lisle, for the treatment of various fibrous plants. Samples of these plants of every species can now be submitted for carefully-supervised trial, and if the present machines or processes prove unsuitable in some little detail or other, the defect will be discovered and remedied. In like manner advice will be given as to the best machines and methods of treating fibrous plants, and the opportunity will be afforded of studying the various processes of production, and of acquiring a knowledge of the most scientific methods of preparing fibres. In fact the present enterprise promises to develop into an important public technical school, for it is proposed to establish branches in textile manufacturing and cognate centres. From a still wider point of view the fibre factory may be regarded as an exhibition and a permanent institution for perfecting machinery and processes relating to the treatment of fibre-bearing plants of every description. The various processes to be carried at the model fibre factory comprise the rapid retting and ungumming of fibrous plants; automatic breaking, scutching, combing, and hackling; spinning into simple or mixed yarns; cottonising and woollenising fibres to imitate fine cotton or wool, suitable for the manufacture of various mixed and cheap fabrics as well as for fine and costly goods; bleaching and dyeing the same, and the rapid drying of fibres by means of cold air. The factory consists of a spacious warehouse and store room for machines and samples, with offices annexed; and a large machinery and operating room, with a laboratory and an engine and boiler house. The chief feature in the operating room is a new machine for dealing more particularly with leaf plants, such as phormium tenax, aloes, agavas, palms, and the like. We saw, says a writer in *The Times*, who describes the factory, some phormium tenax put through this machine with great success, and with rapidity and simplicity. Another machine is a scutcher for hemp, flax, rheea, and, in fact, all stem fibres. In this we saw some rheea stems from France easily decorticated without previous soaking or steaming. The wood was well taken out and the fibre left ready for ungumming and subsequent treatment. In the plants thus treated the fibre is got out mechanically, and is then treated according to requirement, by ungumming, bleaching, and preparing for spinning. There is also a spinning machine in order to test the various fibres in this respect, and to see how they are likely to meet the requirements of a commercial article. Another important improvement is also being introduced at this factory, and that is the rapid retting of flax. The usual method of retting is to soak the flax in water for about three weeks. By the new process this will be effected in about a couple of hours. This quick action is brought about by submitting the flax to the intermittent influence of heat and moisture, which is stated to be very effective, and in no way to act prejudicially upon the fibre.—*H. and C. Mail.*

THE BLACKMAN TEA WITHERING SYSTEM.

Data, based upon actual working experience in India, more than endorse the good opinion we formed of the Blackman system of tea withering when we commented upon it in 1885. The fact of its being a *truly natural process*, or more exactly speaking, a reduction of the *natural process* to complete control, in the simplest manner possible, at once invited sympathetic attention to it, in that all attempts to "wither" artificially as distinguished from "natural withor" had so far proved failures. It was recognised that the extreme simplicity of the Blackman system, by requiring no manipulation of the leaf, no boxing in of space, no trollies, and in fact nothing but the simple fans erected judiciously to suit existing tea houses, left it unapproached for efficiency, simplicity, and economy. That this estimate was justified has since been amply demonstrated by the unanimous testimony of those who have tried it according to the plans provided by the Blackman Ventilating Company's experts. As we have said before, the fan is only the tool employed, and though its record of success is without rival, this success in a large measure depends upon the amount of skill shown in erecting the tool to suit local conditions and requirements. From time to time reports have come home from India which have been most encouraging, but it was not till last cold weather that planters seem to have been irresistibly tempted by the results they witnessed on those gardens supplied with the system. Orders then came in freely from those districts where the success of installations erected upon the plans sent out from home had carried conviction to the sceptical. Some of the reports received by the managers of tea companies, from the garden managers, upon the working of the Blackman system this season, speak for themselves. The manager of Teekulpar (Cachar), writing to the manager of the Land Mortgage Bank, Limited, under date June 27th, 1890, says: "The highly favourable characters the brokers give our latest teas, are due to something more than the natural improvement of the leaf, and I think this may fairly be attributed to the excellent work the Blackman propellers do. . . . Experience shows that the temperature is not very high. . . . The morning's leaf is weighed into the tea-house about midday, and the rolling commences some time that afternoon; the evening's leaf is either rolled the same night or very early the following morning. One very great advantage of this plan is the excellent colour we are able to get in the course of fermentation. . . . The fans have been put to a very special test during the past fortnight, the rain, day and night, having been almost incessant, so much so, indeed, that some of our neighbours (without fans) have had to stop plucking as they cannot wither their leaf, but our manufacturing of tea has gone on as usual, and the quality of the tea is as good as if the weather were fine. . . . I am happy to be able to report that the use of the Blackman air propellers in our tea-house has been a very decided success, and that the general adoption of these useful machines should work a revolution in the system of manufacturing tea." The same manager, in a subsequent letter dated July 10th last, confirms his first report as follows:—"The propellers are doing our work admirably, and we are having no difficulty in withering the whole of our leaf with them, and this during a succession of weeks of the worst weather one could imagine for manufacturing."

The manager of Lattakoojan Tea Estate (Assam), writing to the manager of the Land Mortgage Bank, Limited, under date June 13th last, says:—"The time occupied in withering, of course, depends in a great measure on the number of dryers in full operation on the ground floor, but in *no case* as yet has it exceeded five hours, the least time being only three hours. *It matters not whether the leaf comes in dry or wet* if there is sufficient heat on the ground floor a *perfect* 'wither,' *as good as any natural 'wither,'* will be obtained in the time specified. . . . As the new withering loft can accommodate 90 maunds of leaf at a time and wither it at the latest in five hours, I need hardly say that we are *now quite independent of all the old withering houses.*

"Then, the manager of Boro Jalingah Tea Estate (Silchar) writing to the manager of Land Mortgage Bank, reports that 'It has been working since April 27th and runs smoothly and well, withering leaf brought in at 12 o'clock in the forenoon, the same leaf being ready for rolling by 4-30 p.m. This I should not consider much of a test of the machine, as the chamber was only completed *in part.*'"

These extracts show that experience is bearing out most satisfactorily the forecast we ventured upon in 1885. It is necessary to reiterate the desirability of the system being erected upon plans sent out from home, based upon the experience already there col-

lected, and with due regard for the expert opinion which the Blackman Ventilating Company possess, to a unique extent, upon all that relates to the laws governing the movement of large volumes of air in motion, and the vagaries to be provided against.—*H. and C. Mail.*

BONES.

The Government of India last October invited the attention of Local Governments to the increasing exportation of bones from India, and asked the Department of Land Records and Agriculture in Bengal to embody remarks on the use of, and trade in bones, in its annual reports. From information gathered on the subject in Bengal it appears that within the last few years the collection of bones from village wastes for export to Calcutta has become the regular profession of a low caste of Hindus—Chamars—and is gradually extending to the outer parts of Bengal, in proportion to the increasing demand of the Calcutta mills, and the extension of railway communication. Heaps of raw bones collected for transport to Calcutta may now be seen along the railway and principal river routes of Bengal. Bones are also collected by the indigo planters of Behar for use on their indigo land. Many of them have erected mills for grinding them to dust. The bones brought into Calcutta are bought up for manufacture into bone-meal. With the exception of a comparatively small quantity of bone-meal sent out to tea-gardens, the report says the whole of the output of the bone-grinding mills in Calcutta is destined for export. The price of bone-meal is said to range from R2 to R2-8 per maund, according to the degree of its fineness and purity.

Numerous experiments to test the efficiency of bone-meal as a manure for paddy have been made in Burdwan and Hooghly. It could not, however, be ascertained how much of the increased yield on any plot manured with bone meal was due to this manure alone, for in most of the experiments bone-meal was mixed with saltpetre, hide-salt, etc., and the experiments made by the ryots were deviod of precision. The best guide to the value of this manure would seem to be the evidence of the ryots who have tried it. The testimony of the ryots and farmers was nearly uniform to the effect that bone-meal is quite as good a manure as oilcake for paddy, potatoes, and sugarcane, but that its effect does not last for more than a year, and that better results were obtained in sandy than in clayey soils. Although bone-meal is acknowleged to be a good manure, oilcake is believed to be superior to it in many respects. It is also much cheaper than bone meal, and is open to no objection on the ground of caste feeling. Until, therefore, bone-meal can be offered at cheaper rates than oilcake, there seems to be no hope of its general adoption in native agriculture.—*Madras Times*, Aug. 19th.

FALSIFICATION OF TEA IN CHINA.

A French chemical journal just to hand gives the analyses of some teas recently seized at Dunkirk and Paris, where they had been sent from China. M. Riche found in his examination of several samples, that they did not differ decidedly from genuine tea in their ash and in the proportion of tannin. But in searching for the alkaloid, the samples were found to give no crystalline theine at all, but in its stead a greenish, viscid substance. It is remarked that the highest percentage of tannin found in the investigation was 16·80. A paper by M. Collin follows, treating the subject from a morphological point of view. The author gives cuts showing the structural peculiarities of true and spurious tea, both as seen with the naked eye and the microscope. He remarks, that this fraud is more readily detected by means of the lens than by chemical analysis. Every true leaf, of whatever variety, has serrated edges. Mr. Hooper, the Government quinologist, who, has analysed a large number of teas, informs us that the adulteration is, no doubt, due to an admixture of leaves from a tree belonging to the same or an allied natural order of the genuine tea bush. The *Gordonia obtusa* belonging to the tea-order, for instance, has leaves with the same aroma and containing tannin and ash in very similar proportions, but the amount of alkaloid forms a very small percentage of the leaf. The Gordonia is a tree very plentifully distributed in the Nilgiris, but the leaves are different to those of tea, both in their margins and apex. A few years ago, Indian planters were looking upon their Chinese brethren with dreaded rivalry, and this was increased when the medical faculty at home were recommending the finely flavoured leaf of the celestials in preference to the so-called harsher tea of India. But we need not fear competition much longer, for when adulteration and falsification are resorted to by men of business, the trade somewhere is radically bad, and China will have to look elsewhere for a market for this time honoured commodity,—*South of India Observer*.

COCONUT BUTTER.

Mr. B. C Basu of the Agricultural Department of Bengal, writes to the Agri-Horticultural Society, Calcutta:—

"I took four nuts of average size, neither very big nor very small, and had the kernel reduced to a coarse pulp with a native instrument called *karni*. The nuts were not fully ripe; the kernel was fully formed, but was yet a little soft. After the kernel had been made into pulp, the latter was squeezed in a thick piece of cloth to express the 'milk.' A little water had to be added to the pulp to make the milk run out freely. The whole of the milk could not, however, be expressed, as I had no proper appliance to do the work. The 'milk' was measured and found to be 3 *paos* or roughly 24 oz., of which quantity 1 *pao* may be taken as water added to the pulp in the act of expressing the milk.

"Immediately after the milk had been expressed it was churned in a soda-water bottle. I intended to use the English churn which I have recently procured from England, but the quantity of milk was too small to be put into a churn. I should mention here, that in the experiment with coconut milk which I made in the last cold weather, I had no need to add any ice or cold water, but in the present experiment, which was made sometime about the end of last April, the weather was hot, the consequence being that the butter refused to 'come'. I then added a little iced water to the milk in the soda-water bottle, and the butter grains immediately appeared. The whole operation did not take more than 15 minutes and could be finished in half the time if cold water was added in the beginning. All that I had now to do was to wash the butter in cold water and gather it into a lump. The butter weighed just a little over 1½ chittacks or 3 oz., that is, 12½ per cent. on the milk. This I considered encouraging; but my surprise and disappointment were great when on opening the vessel in which I had put in the butter, I found that it had all melted and was floating on the top of the water. In the cold weather the butter kept pretty firm day and night; but in the hot weather it would be impossible to keep it solid, unless it was put in iced water. Under the circumstances, I believe it is useless trying

to make coconut butter in a hot climate like ours."

In a subsequent letter Mr. Basu conjectured that the butter fats of the coconut might be of two or more kinds, with different melting points, and in that case those that melt at a low temperature might be removed and the balance would remain solid.

In connection with the subject, the following from the journal of the Society of Chemical Industry is of interest:—

The following is an extract from the last report of the United States Consul at Mannheim on the subject of the manufacture of coconut butter in Germany:—

"German chemists discovered in the coconut a fatty substitute for butter.* This discovery was made by a Dr. Schlunk, practical chemist at Ludwigshafen-on-the-Rhine. Shortly after the discovery was made a firm was established in this city under the name 'P. Muller and Shone,' which sunk a large amount of capital in an enterprise, having for its object the production of the new article, to which they gave the name of coconut Butter. The results achieved have more than justified their expectations. The firm is not able to meet the constant demands made upon it. Although in existence only one year, it employs 25 workmen, who get from 25 to 75 cents a day, has a 40-horse-power engine, and produces daily 3,000 kilos of butter, which retails at from 55 to 65 pfenings, or from 13 to 15½ cents per pound, or 25 to 30 cents per killogramme.

"The nuts are obtained from almost all lands lying in the tropics especially from the South Sea and Coral Islands, Arabia, the Coast countries of Africa, and South America. Natives in countries where the nuts grow have for a long time used the milk of these nuts instead of food oils. It contains 60 to 70 per cent of fat, and 23 to 25 per cent of organic substances of which 9 to 10 per cent is of albumen. Liebig and Fresnius had already discovered the value of the coconut oil, or fat, but did not succeed in its production as a substitute for butter, The new butter is of a clear, whitish colour, melts at from 26 degrees to 28 degrees C., and contains 0·0008 per cent water, 0·066 per cent mineral stuffs, and 99·9932 per cent fat.

"It hardens at 190 C. It is better adapted, however, for the kitchen than for the dining-room, that is for cooking purposes than for the uses to which butter is put on our tables. It is neither disagreeable to the taste nor smell. In a country where real butter runs all the way from 25 to 35 cents. per lb., and coconut butter costs but 15 cents, a great future must open up before the latter. At present it is chiefly used in hospitals and other State institutions, but is also rapidly finding its way into houses or homes where people are too poor to buy butter. The working classes are rapidly taking to it instead of the oleomargines, against which so much had been said in the papers during the last two or three years.

"The new butter is said to be singularly free from acids and other disturbing elements so often found in butter, especially that made from milk taken from cows diseased with tuberculosis. Here it is estimated that fully 10 per cent of the milk-giving cows are so troubled. This absence of acids and other matter renders its digestion much easier, hence the preference already shown for the new article by hospitals and such institutions. There are those who do not hesitate to declare this new substitute as healthier and infinitely preferable to the too often bad butter brought on the market, and not to be named in the same breath with oleomargarines made too often from the diseased fat of horse and sheep flesh.

"When it is remembered that Germany has already some 50 factories making olemargarines and other artifical butters, and that some 180,000 *centners* are procured annually, it will be readily seen that regular butter will have hard work to hold its own in a hundred uses against its new rivals, and especially so since the oleomargarines and artifical butters of all kinds are placed under severe, careful, and watchful state inspectors."—*Indian Agriculturist.*

* The young kernels scraped to the consistency of cream give special zest to Sinhalese curries.—ED. *T. A.*

BANANAS AND MELONS IN ASSYRIA.—In the July number of the *Babylonian and Assyrian Record*, Dr. Bonavia attempts to show that the Assyrians partook of Bananas and Melons at their dessert. So far as the Melons are concerned, this doesnot seem at all unlikely; but as to the Banana, the case seems rather more doubtful. It may have been so, but the illustrations given from Botta's *Monuments de Ninive*, seem as much like bundles of Asparagus as Bananas. Surely the Assyrians did not make use of a Covent Garden bundling machine?—*Gardeners' Chronicle.*

THE INTERNATIONAL CONGRESS OF AGRICULTURE AND FORESTRY, at which Great Britain, among other States, is represented, was opened at Vienna on Sept. 2nd under the presidency of the Marshal of the Province. The members of the Congress number nearly 909, delegates being present from Great Britain, Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Roumania, Russia, Servia, Sweden, Switzerland, South Australia, India, Brazil, and Japan. The representative of England is Mr. Ernest larke, the secretary of the Royal Agricultural Society of England. Upon the president of the committee, Baron Hohenbruck, Councillor of the Ministry of Agriculture, and the secretary, Chevalier Max von Proskowetz, F. R. G. S., a gentleman well known in England by his, exploration in Central Asia and Eastern Russia has fallen the brunt of the labour of organising the congress.—*O. Mail*, Sept. 5th.

MINOR AILMENTS AND THEIR CURES. II.

BALDNESS, OR LOSS OF HAIR.—This generally results from worry and overwork, or impairment of the general health. Many preparations of cantharides are recommended, but many of these undoubtedly prove beneficial. At the same time, it must be remembered that it is not purely a local complaint, and much may be done by improving the general condition of the health. A bland, unirritating application for the scalp is Lanoline, which is readily absorbed by the skin. Lanoline contains cholesterine (a fatty substance), and it is this which maintains the hair lustrous and soft without greasiness. Lanoline, in the form of Lanoline Pomade, shuld be rubbed in freely night and morning, preferably in front of a fire. Hazeline applied freely by means of a piece of Lawton's Absorbent Cotton will speedily relieve any inflammation or irritation of the scalp.

ASTHMA.—Asthma is a paroxysmal ailment to which many persons are subject. The attacks usually come on suddenly, vary greatly in intensity, and may last from ten minutes to three or four hours. It is sometimes no easy matter to cut short an attack, but benefit will often be experienced from the use of Nitre Papers, Stramonium Cigarsttes, and the use of the Chlroide of Ammonium Inhaler (Vereker's). In the intervals, the administration of ten drops of Pure Terebene every three hours, with its occasional inhalation, has been found beneficial. Pinol has also been used for this purpose, and is now largsly employed. It is very important that the bowels should be carefully regulated, and for this purpose, Laxative Tabloids may be used, one or more being taken every morning according to the requirements of the patient.

BLACK EYE.—One of the best applications for a black eye, resulting from a blow or contusion, is Hazeline, applied freely on lint or absorbent cotton. Very hot water, applied frequently, is one of the best remedies. As a rule the condition runs its course, and it is difficult for the sufferer to prevent an unsightly appearance for some days.—"*Health,*" London.

SOME OBSERVATIONS ON TEA DRYING MACHINERY.

(BY C. B.)

* * *

In deciding upon the best class of machine, the first question to be considered is *power*; if the factory is supplied with unlimited water power the decision should at once be made in favour of one of the *fan* machines, because the fuel consumed by such is about 10 per cent. less for weight of tea dried than by machines which do not require power. If there is abundance of steam power available the same consideration holds good, but to a limited extent, because the extra fuel used in the boiler will nearly balance the difference of fuel used in the drying machines, and the fact is to be taken into account that the engine will have to be kept going for hours after the rolling work is finished. When power in the factory is limited, it is obvious that the decision should be in favour of such machines as the *Up*-draft Sirocco, because it is independent of the engine, and can be placed in any part of the factory, irrespective of the position of the other machinery.

Several machines to do the required work are better than one only of large capacity, because any little accident deranging the latter would bring the whole of the drying to a standstill, whereas in the former case a difficulty with one machine could be overcome by extra pressure upon the others; and, besides, if the extra heat from drying is utilized for withering floors overhead, it is evidently better to have such heat-producing apparatus distributed than to have it concentrated on one spot, unless indeed withering fans are employed to distribute the heat. Another consideration is that it does not pay to work a large machine for drying a small quantity of tea in the slack season, for it stands to reason that an immense body of iron, and perhaps brick, as well as *floor*, takes a great deal of fuel to bring it up to a temperature of 240 deg.; and this is an expenditure which is greater even for a short day's work than for a long one, because there is a longer interval of cooling down between working hours. Besides all this it is well to have one or two machines doing the finishing off only, as no machine yet invented will, under ordinary circumstances, dry the tea *pucca* at one go. Viewed from every point, therefore, it is better to have, say, not less than four machines for a moderate sized factory than to have one large machine capable of drying the whole.

In choosing a type of machine it is well to look to *substantiality*; of course it goes without saying that a machine which will unfailingly produce tea of even ½d. per lb. better than others is to be got at all cost; but no such superiority has yet been established for any one, and the fact remains that the most substantial will prove the best in the long run; provided always that the price is not *very* serious (though they are all more expensive than they should be), since it is quite possible that during the next five years some genius may place in the market an article which will meet most of the requirements still left untouched.

A machine with an excessively powerful fan is to be avoided by all, for many reasons. Such a machine is useless for final firing, because it will blow away the finest of the tea; it dries rapidly by passing through the tea a much larger quantity of air than in the more moderate processes, and the fierce strong blast must destroy a great deal of the aroma of delicately flavoured teas; the *power* required to work such a fan is enormously more than people are apt to think when they twirl the thing round by one hand when the bolt is off; and the consequent consumption of fuel in the boiler and the wear and tear of connecting machinery are no small items: the heat in the air after passing through such a machine will be found to be out of all proportion to the amount of moisture carried away, and is therefore a direct waste and in many cases must be a positive nuisance. It is a mistake to think that such heat can be utilized for withering because drying is supposed to be going on when the withering is finished, or nearly so.

It is an undoubted fact that machinery is a saving of labour, and some of the drying machines save a great deal in that way; in most cases this saving is to be reckoned at much more than the actual wages, because it sets free the labour for other work in the most busy season, when increased cultivation may be of vast importance to quality as well as quantity of tea.—*Indian Planters' Gazette*, Aug. 26th.

THE RAMIE FIBRE.

PROGRESS OF ITS MANUFACTURE IN THIS COUNTRY.

Editor, "Manufacturers' Record."

Now that fabrics made of ramie fibre, and of American manufacture, are on sale and can be had regularly of the trade, one more staple hitherto unknown to the American agriculturist may be established on a scale that will produce an annual revenue to the farmers aggregating an immense sum. All experiments in the cultivation of the ramie plant in this country have been on a small scale, not even sufficient in their proportions to demonstrate an efficient and practical method of decorticating the stems.

A serious obstacle to the progress of ramie cultivation in this country has been the element of doubt regarding the demand for the fibre. Enthusiastic writers upon the subject of ramie culture have greatly exaggerated the demand for China grass (ramie) said to exist in Europe. In recent years the price of China grass has been so high, compared with other fibres, as to prohibit its use in Europe except in moderate quantities. Large sums of money have been expended in Europe experimenting in the fabrication of what is universally acknowledged to be the finest and most valuable vegetable fibre known to the commercial world. Costly experiments were conducted to properly ungum the fibre of imported China grass. Generally these experiments have been unsatisfactory, while the appearance of the resulting fibre seemed perfect, being fine, glossy and white. Yet when spun and put into cloth the fabric would crack, and many other difficulties were met with in this fabrication which were known only to the art.

Moreover, the fibre obtained was always costly, which made it necessary to introduce it only into high-priced goods. This involved another class of experiments, such as machinery for spinning and to complete the fabrication of a kind of goods that would command a sufficient price to make the enterprise remunerative. Some of the European experimenters seem to have been partially successful, but they have not created a large demand for the fibre.

From an American standpoint, there is not a large establishment in Europe running on ramie. It has remained for Mr. Charles Toppan to thoroughly and perfectly ungum the fibre, so that it can be spun and carded by ordinary cotton and woollen machinery, giving a result that permits the fibre to be used in the manufacture of cheap fabrics. This has not been accomplished in any other country, and its value can hardly be overestimated, for inasmuch as the fibre is produced cheap enough to be used in low grade goods, now the demand for the raw material will be large. The evidence of this is in the fact that the first six months of 1890 will show a consumption of China grass in the United States greater than was consumed in all Europe in the year of 1889.

The manufacture of goods from ramie is now established, and the fibre will soon find its way into the highest grade of fabrics. Men's suitings and fine underwear are already being made here from it.

A commercial journal, recently commenting on the varieties of ramie, states that there is an annual variety valuable only for cordage. This is probably an error as to its being a variety of ramie. China and Japan produce the well-known commodity we know as China grass or ramie, and while there are several varieties, the plant is a perennial. The annual referred to is probably in no way allied to the China

grass of commerce, but it may be a fibre used to adulterate. The adulteration of China grass for shipment is not new, and has frequently attracted the attention of shippers.

The mechanical decortication of ramie in the field has not made such progress as has been made in the degumming of the ribbons. The reasons are plain. In solving the degumming problem, many tons of China grass were at once imported and the product turned out, not by the pound, but by the ton. Yarn is now being made by the ton, and the products are being sold by the bolt. Machines that effectually and rapidly produce the ribbons from the green stems in the field will put the United States in the lead as a ramie producing and manufacturing country. But the ramie must be grown to be decorticated. The ribbons must be produced by the ton and continued until many tons are produced before results are obtained. Possibly the recent offer of the use of a machine free to those who will grow 25 acres of ramie within the next two years will stimulate its cultivation.

T. ALBEE SMITH.

JAMAICA AND ITS FORTHCOMING EXHIBITION,

By C. WASHINGTON EVES, C.M.G.

PLANTING PROGRESS IN JAMAICA.

Jamaica is singularly varied in its climate and natural features. Its general botanical resources are of a wonderful extent and richness; its useful or economic plants have been thoroughly investigated, although as yet a small number have entered largely into commerce. These latter have, however, received much attention from Mr. D. Morris, the present Assistant Director of the Royal Gardens at Kew, when he was in charge of the public gardens and plantations of the island, and one of the important features of the exhibition will be the proof of the value in arts, manufactures, and food, of the economic plants of Jamaica. The island is 144 miles long, its greatest width is 49 miles, and its least width—going straight across from Kingston to Annotto Bay—is 21½ miles. It contains 4,193 square miles. It is diversified by mountains and their attendant streams, and the climate ranges from 75° to 80° on the coast and flat lands adjoining, to 60° and 65° on the high mountains, such as the Blue mountain range. The dryness of the atmosphere upon elevated portions, such as the Santa Cruz mountains, has attracted much attention for its health-giving qualities, and its influence upon consumption and bronchial affections generally.

This deversified elevation is naturally conducive to variety of cultivation. Sugar is grown (though to a much less extent than formerly) in those parts of the island specially adapted to its cultivation, whilst the, Blue Mountain coffee is the finest in the world. Fruit especially the banana, is grown extensively. Cinchona bark does not, at present, appear to be increasing as an article of export, chiefly owing to the low prices at present ruling. If a febrifuge could be produced on the spot cheaper than quinine, there would be a better prospect of success for this industry. In the cultivation of tea the labour difficulty may possibly be felt. The director of public gardens, Mr. Fawcett, reports:—"From the Blue Mountain ridge down almost to the sea coast on the north side the conditions are favourable for the growth of tea. The plant has become naturalised, springing spontaneously from self-sown seed;" and the manufactured leaf, when shown at exhibitions, has been much approved. Jamaica oranges, says Mr. Fawcett, "ought to be able to hold their own anywhere against those from Florida; they are finer fruit, and produced at much less expense. Land in Jamaica is abundant and cheap, and the soil is fertile." A great drawback is that the fruit is either shipped in an improper condition, or is not packed with care. An object lesson in packing oranges will be one of the most useful features of the Exhibition. While upon this point, I might refer to some remarks made by Mr. D. Morris. in the paper read by him before the Royal Colonial Institute in February, 1887. Fruit equal to a value of £8.000,000 sterling is yearly imported into the United Kingdom. The import into the United States must also be very large, nearly the whole of the fruit grown in Jamaica going to that country. Mr. Morris says, and I quite agree with him, that "when fruit is produced in large quantities, and it possesses a distinct value in foreign markets, it is a matter which concerns the Government, no less than the people generally, to take every step that is practicable and suitable to place that fruit in such a market in the best possible condition. Great care is taken generally in the preparation of crops of sugar, coffee, cacao, pimento, tobacco, ginger, and other produce; but the careful and scientific treatment of fruit, although capable of yielding returns proportionately quite as large as any of these, is practically overlooked, and consequently the loss entailed upon both growers and shippers is enormous." We may hope that the Exhibition will produce such examples as will remove this reproach so justly made by Mr. Morris. Indeed, his remarks have had already considerable effect.

A select committee of the Jamaica Legislative Council recently reported as follows upon this question:—"Your Committee believe that one chief danger to the fruit trade lies in the fact that the parties engaged in packing fruit are ignorant of the best methods in force in countries where the trade has reached far larger dimensions than is likely to result in Jamaica, at least for some years to come; and they are of opinion that great benefit would accrue if experienced fruit packers could be introduced from the Mediterranean, or the Western or Canary Islands. If the trade accepts this suggestion, and should ask the Government to assist in introducing this class of skilled labour, your Committee recommend that the Government should render all the aid it can in its introduction."

It cannot be too plainly stated that the future of the fruit trade of this island depends mainly on the proper selection and packing of all kinds of fruit exported; and the trade will not only be injured directly but the island must also suffer, if those who are engaged in the business do not combine to do all that can be done to prevent the shipment of fruit of poor quality, or defectively put up.

The total acreage in Jamaica under cultivation and care, in 1879 and 1888, was as follows:—

	1879.	1888.
	Acres.	Acres.
Canes	44,948 ...	33,616
Coffee	22,853 ...	20,075
Ginger	130 ...	218
Arrowroot	33 ...	10
Corn	649 ...	822
Tobacco	341 ...	167
Cacao	37 ...	935
Vegetables	44 ...	51
Ground provisions	58,444 ...	79,382
Guinea grass	122,369 ...	122,197
Common pasture	272.431 ...	313,137
Common pasture and pimento	42,010 ...	44,539
Pimento	1,155 ...	1,455
Total number of acres under cultivation and care ...	565,448 ...	616,594

Note.—Fruits are not included in the above statement, as they grow indifferently among other products.

It cannot be held that the above figures show any sensible advance in ten years. The most satisfactory items are the ground provisions. grown by the peasantry occupying small holdings; and the cacao cultivation There are a number of small settlers in Jamaica, growing patches of cane, and possessing sugar mills made of the hard woods of the country. The appliances are no doubt very crude, but if they could be improved, and the extraction made more economically, such as industry might increase.

Of the actual resources of the island available for export, the Table of Exports for the years 1888 and

1889 respectively may be taken:—

	1888.	Value £	s.	d.
Annatto ...	524,429 lb ...	3,583	11	9
Arrowroot ...	27 cwts. 2 qrs. 21 lb	38	3	6
Beeswax ...	1,033 cwts. 1 qr. 21 lb	4,822	15	0
Cattle, neat ...	79 ...	790	0	0
Cocoa ...	4,750 cwts. 0 qr. 6 lb	10,640	2	5
Coconuts ...	5,909,301 (number)	20,682	10	10
Coffee ...	98,965 cwts. 2 qrs. 8 lb	321,440	2	3
Cinchona bark ...	4,015 (number)	151	7	0
Fruit, bananas...	3,093,393 bunches	270,671	17	9
„ limes ...	634 barrels	317	0	0
„ mangoes .	299,584 (number)	258	9	0
„ oranges...	47,910,177 (number)	64,678	14	8
„ pineapples	9,812 dozens	1,471	16	0
„ shaddocks	10 barrels	5	0	0
Ginger	10,222 cwts. 0 qr. 13 lb	19,462	18	2
Hides	277,828 lb	5,788	2	6
Honey	1,680 cwts. 1 qr.	1,344	4	0
Horses and Mule	100 (number)	2,377	0	0
Lancewood spars	7,921 (number)	2,383	15	6
Limejuice	85,963 gallons	2,865	8	8
Pimento	66,559 cwts 2 qrs. 2 lb	44,727	19	9
Rum	1,868,490 gallons	202,419	15	0
Sheep's wool	19,448 lb	323	12	8
Sticks (walking)	16,842 loose, 628 bundles	434	12	0
Succades	73 cwts. 0 qrs. 22 lb	469	14	0
Sugar	490,480 cwts. 0 qr. 25lb	288,402	7	9
Tamarinds	4,939 lb	90	9	0
Tobacco, cigars.	7,008 lb	3,504	0	0
„ (unmanufactured) ...	... ...	...		
Tortoise shell ...	2,008 lb	578	11	0
Turtle ...	2,688 (number)	4,244	10	0
„ (prepared and dried) ...	8,587 lb	1,132	6	10
Wood, bitter ...	218 tons 10 cwts	437	0	0
„ ebony ...	57 tons 5 cwts.	143	2	6
„ fustic ...	2,463 tons 8 cwts.	7,390	4	0
„ lignum vitæ	20 tons 13 cwts.	61	19	0
„ logwood ...	100,901 tons 6 cwts.	353,154	11	0
Yams ...	28,194 cwts. 1 qr.	11,277	14	0
	1889.			
Annatto ...	455,874 lb	3,798	19	0
Arrowroot ...	7 cwts. 1 qr. 14 lb	11	6	8
Beeswax ...	1,018cwts. 0 qr. 22 lb	4,571	11	8
Cattle, neat ...	26	260	0	0
Cocoa ...	5,248 cwts. 3 qrs. 19 lb	10,581	16	5
Coconuts ...	4,831,615	15,219	11	9
Coffee ...	84,606 cwts. 0 qr. 8 lb	291,383	6	2
Cinchona bark ...	3,321 (number)	66	0	0
Fruit, bananas...	2,881,313 bunches	252,114	17	9
„ limes ...	701 barrels	350	10	0
„ mangoes .	170,988 (number)	100	19	6
„ oranges ...	35,394,271 (number)	51,321	13	10
„ pineapples	8,292 6-12 dozens	1,036	11	3
„ shaddocks	33 barrels	16	10	0
Ginger ...	8,952 cwts 1 qr. 1 lb	18,615	8	9
Hides ...	260,641 lb	6,516	0	6
Honey ...	1,248 cwts 1 qr. 2 lb	1,248	8	9
Horses and Mule	67 (number)	3,426	0	0
Lancewood spars	8,062 (number)	2,821	14	0
Limejuice ...	77,745 gallons	3,239	7	6
Pimento ...	46,179 cwts 3 qrs. 21 lb	47,842	8	4
Rum ...	1,374,931 gallons	137,493	2	0
Sheep's wool ...	23,081 lb	381	13	8
Sticks (walking)	171,144 loose, 1,303 bundles	2,576	11	1
Succades ...	48 cwt. 3 qrs. 13 lb	197	3	2
Sugar ...	323,238 cwts. 1 qr. 1 lb	244,368	2	5
Tamarinds ...	1,775 lb 32 kegs	45	15	0
Tobacco, cigars	4,479½ lb	2,799	13	9
„ (unmanufactured) ...	1,593 lb	79	13	0
Tortoise shell ...	3,673 lb	1,469	4	0
Turtle ...	2,742 lb	5,007	14	0
„ (prepared and dried) ...	12,069 lb	1,529	17	0
Wood, bitter ...	649 tons, 19 cwts	1,299	18	0
„ ebony ...	383 tons 2 cwts	956	15	0
„ fustic ...	793 tons 8 cwts	2,142	3	7
„ lignumvitæ	446 tons 19 cwts	1,251	9	2
„ logwood...	115,454 tons	375,225	10	0
Yams ...	6,149 cwts 0 qr. 16 lb	3,074	11	6

The new struggling industries in the above list will be noticed. Tobacco makes no way at present. The difference in the export of yams between the two years suggests an unfavourable season for roots and ground provision. Upon the whole, the above table presents a state of things which is certainly capable of great improvement. The valuable and historic industry of sugar, for instance—an expensive product requiring large capital for expenditure, principally in wages enjoyed by the industrial classes—should not be allowed to die out while Englishmen eat every year nearly a million tons of beet root sugar, produced by foreign labour, and aided by foreign State bounties. A careful consideration of the above figures will show that there is much to be done, not only in maintaining existing industries but in planting new ones, a number of which have been suggested, and will be reforred to later on; and it is for the purpose of calling attention to the undeveloped agricultural wealth of the island that an exposition of its capabillities is so much desired.

As the exhibition is primarily a display of Jamaica products, it was opportune on the part of the Governor to issue a "Message to the people," recommending local effort in every part of the island. His Excellency mentions that prizes will be offered for samples of the following, among many other things, grown or made by the people:—Sugar-canes, cacao, kola, bananas, oranges, ground provision, coconut, Sisal hemp, Manilla hemp, tobacco, cigars, cinchona, coffee, peppers, ginger, pimento, rum, logwood, fustic, annatto, castor oil, coconut-oil, cattle and horses, sheep, pigs, poultry, birds, fishes, turtle, bees, carpentey, cabinet-making, basket-work, nets, mats, goldsmiths' and silver work, models of cottage homes, boats, fancy work, &c. Greater researches for minerals are recommended. Gold, silver, and copper have been discovered in the Charing Cross mine, and ten tons of ore have been recently shipped to London. Special arrangements are also suggested for collecting large samples of the various rubber substances to be obtained from a number of trees. From the mineral, vegetable, and animal kingdom, a great variety of raw material could be obtained, some that might locally be manufactured or prepared for consumption, and others useful to the manufacturer abroad. In the different parishes are found limestones, sandstones, flagstones, marbles, road materials, sands, ochres, clays, ornamental and precious stones, gypsum, copper ores, lead, iron, zinc, cobalt, manganese, antimony, gold, and silver. Few countries are better supplied with building-stone, which varies in degree from the finest marbles to coarse but enduring sandstones. Fine marbles of different patterns and colours are found in many parts. There is a great extent of granite rocks.

Jamaica is rich in fibres, and a serious attempt is to be made to utilise them for several purposes. Bamboo and megass (or the sugar-cane after crushing) might become important for paper making. In the even of the Esparto grass failing, as was at one time feared, a substitute becomes very important. I have some excellent specimens of paper stock and writing paper, made some years ago by Mr. Routledge from bamboo and megass. There are many other uses for the fibres found in Jamaica. What is wanted is a good and inexpensive machine for their extraction. The institute of Jamaica has offered a prize of £50 for the best set of machines which may be shown at the Exhibition. I have communicated with the principal English and foreign manufacturers upon the basis of information forwarded by Mr. Morris, of Kew. It might be interesting to quote some extracts:—

"The set of machinery might include a banana machine, as well as others. The banana machine should be portable and simple, adapted for the expression of water from the stem of the banana, to be constructed especially for the use of small plantations, and at a cost so as to be placed within reach of small cultivators.

"The following native and other fibre plants are already found in Jamaica, and machines are desired to clean the leaves or stems of any of them.

I. Aloe Family.—1. American aloe (*Agave americana*). 2. Keratto (*Agave Morrisii*). 3. Sisal hemp or hene

quen (*Agave rigida*). 4. Fœtid aloe or Mauritius hemp (*Furcræa gigantea*). 5. Silk grass (*Furcræa cubensis*). 6. Dagger plant (*Yucca aloifolia*). 7. Bowstring hemp *Sanseviera zeylanica*). 8. Bowstring hemp (*Sanseviera guineensis*).

II. Ananas or Pineapple Family.—1. Pineapple (*Ananassa sativa*). 2. Pinguin (*Bromelia pinguin*). 3. Silk grass (*Karatas Plumieri*).

III. Banana and Plantain Family.—1. Banana (*Musa sapientum*). 2. Plantain (*Musa sapientum*). 3. Manila plantain (*Musa textilis*). 4. Abyssinian plantain (*Musa ensete*).

IV. Nettle Family.—Ramie or rhea (*Boehmeria nivea*).

"As regards the fibre of the plantain and banana, it is estimated that about two million stems of these plants, after bearing fruit, are cut down every year in Jamaica. In the absence of a suitable machine to prepare the fibre, these stems are allowed to rot on the ground, or are converted into manure. A full-grown plantain or banana stem weighs about one hundredweight, and contains only about two pounds of fibre. The bulk of the stem is made up of watery juices and soft pulp. A simple and effective machine of the nature of a wringing or mangling machine is required, through which portions of the banana or plantain might be passed to free them from water. The machine must be portable, and the rollers should be made of hard wood. Iron would soon rust, and also be too heavy. When the stems have been passed through the machine, they could then be easily carried to a more elaborated fibre machine, or taken to the nearest stream and washed and beaten.

"It is well known that banana fibre is not of high value, and probably would not be worth more than one penny or penny half-penny per pound. On the other hand, its production, under present circumstances in Jamaica, would entail very little expenditure, and, with a suitable machine, would bring in a considerable revenue to the cultivators. Even at one penny per pound, Jamaica could produce banana fibre worth about £20,000 per annum."

We also want information as to the latest processes of sugar-making—that is the means of extracting the greatest quantity of juice from the cane, and the greatest quantity of sugar of good quality from the juice. We should like to obtain, for instance, a model of a diffusion plant, now so largely used in Europe in the beet factories. It is possible that the fibres of the cane may prevent the rapid and easy slicing by knives, which is found adapted to the beet-root, and that the process may not be found a good substitute for the old-fashioned system I believe that enterprising planters, both in Demerara and St. Lucia, are making practical experiments, and we hope to be able to obtain for the information of sugar makers in Jamaica a model of the apparatus employed. Rum distillation, too, is important for Jamaica. Rum is a natural product of the sugar-cane, and is an article for which Jamaica has long been famous, the flavour and quality depending not so much upon manufacture as upon soil. The Chancellor of the Exchequer recently asked: "Who drinks rum?" It is evident that a considerable quantity is drunk, and some is no doubt employed in the manufacture of European brandies and whiskies. So long as there is a demand for rum, Jamaica is justified in producing it, and no other country has such natural advantage for its production. A knowledge of the latest improvements in distillation might supersede the somewhat crude and rule-of-thumb method too frequently adopted.

It would be also interesting to obtain models or specimens of machines for preparing the coffee berry for consumption, and others showing the different forms into which cocoa and chocolate are made such attractive articles of food. The preparation of turtle for food, castor-oil for medicine, and the different gum and rubber manufactures, would likewise be desirable for the exhibition.

DISCUSSION.

Mr. Morris said Mr. Eves had stated that the cost of producing cinchona was too great for it to be successfully cultivated in Jamaica, but he thought that was not quite the case. After the cultivation had been carried on for some time, the price fell so low that it was really not worth exporting, and no doubt it would be better for the people to keep their trees for the present, and let the bark become more matured, so that when the price rose they would get a better return. The cinchona trees were more healthy in Jamaica than in many parts of the East Indies, so that he had little doubt about the ultimate success of the industry. As to tea, he thought that in face of the enormous shipments from Ceylon and India, that it would not be wise for the people of Jamaica to take up this matter. The fruit industry was one which had grown very considerably within the last fifteen years, for whereas in 1876 the total value of the fruit exported was only about £10,000, it was now between £300,000 and £400,000. That trade had done a great deal of good to the island generally, though there was no doubt better picking and preparation of the fruit would still further increase its value. The oranges grown in the island were very fine. With regard to fibre industries, he had urged the people to take up this branch, and as the price rose 50 per cent. during the last four years, they might have reaped the full value of the increase. However, it was not yet too late to take up the matter. The Jamaica Institute had offered a prize—£50 for a set of machines to produce fibre in different stages, and he had great hopes of such a machine being brought out. They also wanted a machine for preparing Liberian coffee. Latterly the price of this coffee had increased to such an extent, that in Java it fetched a price equal to that of the best estates coffee, and it could be grown upon the old sugar plantations. With regard to the rum industry, attempts were now being made for the first time to carefully examine the yeast, and trace the real cause of the different qualities of rum produced. There were numerous industries in Jamaica which might be taken up, but the people were so comfortable, and so satisfied with their beautiful climate, that it was very difficult to stir them, and get them to take sufficient trouble to develop fully the resources of the country. He had no doubt that the Exhibition would be a very great success, and that it would be a benefit not merely to Jamaica, but to the whole group of our possessions in the West Indies.

Rev. D. J. East, who had resided for thirty years in Jamaica, said:—The great want of the island with regard to minor products had already been dealt with by Mr. Morris. What was wanted was a better class of machinery, both with reference to fruit and fibre. The people needed instruction as to the gathering of the fruit. He had seen oranges pulled from the trees, thrown into carts, and brought into Kingston in a condition which gave very little promise of their realising a return. He had also seen them hand picked and properly packed, first in paper, and then in suitable barrels for their conveyance, and the difference in the result had been perfectly amazing—the one method as contrasted with the other. Another great want in connection with the fruit industry was better roads in order to bring the produce to the wharves for shipment, and he was glad to know that Sir Henry Blake was giving special attention to this subject. He thought Jamaica might supply the world with fibres. Some of the most valuable fibrous roots would grow on land which was hardly suitable for any other production; but the great want with reference to fibre was suitable machinery. They had not yet had a machine of so simple and effective construction as to be of much use, especially to the peasantry of the country.

Mr. H. Stern said:—Reference had been made by Mr. Morris to the advantages which might have been reaped by cultivating fibre plants, but it was no use doing so unless they had a machine to extract the fibres. Some years ago the Government offered a prize of £50 for any machine which would extract the fibre from the Sisal hemp, and a machine was invented by Mr. Kennedy, but it was found that that would not extract the fibre with sufficient economy to make it marketable He was very glad to see that another prize had been

offered, and he hoped that some good would result therefrom.

Mr. Morris remarked that fibre machines had been at work for eleven years in Yucatan and six years in Mauritius. There was no great difficulty about cleaning Sisal hemp, or the pineapple family; the great difficulty had been with regard to the banana and ramie. He had examined some machines at Paris for dealing with china grass, and it was hoped that M. Favier would send one of his machines to the Exhibition. These machines would prepare one ton per day of the ribbons. The cost of such machines was about £80, while the machines in use at Mauritius cost £25. Full particulars of these machines are given in the *Kew Bulletin* for November, 1889, and May of this year.

Mr. O'Halloran asked what success had attended the efforts of Mr. Morris to cultivate Manilla hemp, which was always marketable, and in very great demand.

Mr. Morris said the Manilla hemp, which was yielded by a kind of banana, was introduced into Ceylon and Jamaica a good many years ago, but unfortunately, they had not been able to get it to flourish; in fact, they had the utmost difficulty even in keeping the plants alive at Kew. He did not believe that the Manilla hemp could be a success in the West Indies. It had been under cultivation in Trinidad, Demerara, Dominica, and at St. Vincent, but they had found that at no spot outside the Philippine Islands would the plant flourish. It would be possible to send the Manilla hemp to any part of the West India Islands, where the conditions were likely to be favourable, but up to the present the results had been most disappointing.

Mr. Scott regretted that more attention had not been devoted in the discussion to the sugar and cocoa industries. He thought, also, great advantages might be derived from the Exhibition in connection with the United States and Canada.

Mr. Morris replied that the cultivation of cocoa in Jamaica was well understood, as was also the preparation of the bean. It was understood they had really been talking that evening of industries which had hitherto lacked success on account of the absence of machinery, or from want of special knowledge. They could not expect to cover the whole of the ground at that meeting, though he was very glad that Mr. Scott had mentioned the subject. They were now dealing with the special difficulties which had hitherto arisen in Jamaica. He believed as land was opened up, and the facilities for transport improved, the cultivation of various industries, both new and old, would be undertaken in the West Indies.

The Chairman said:—I do not know how it may be now, but 50 years ago there were great differences between the coast aspect of Jamaica, and of San Domingo and Cuba. These larger islands are equally beautiful in scenery, but in those days Jamaica alone seemed well cultivated, and to show along the coast line the residence of a population in favourable conditions of life.—*Journal of the Society of Arts.*

EXPERIMENTS WITH MANA-GRASS —ECONOMIC PRODUCTS FOR THE ZAMBESI.

A long letter obligingly written me yesterday by Mr. Ibotson is not very encouraging as to anticipation for success with the present set of experiments for testing the suitability of mana-grass as a board-making material. When my last notes on this topic were written you, my letter stated that it was intended to try the effect of subjecting the boiled grass to the action of edge-runners in the pug mill before passing it into the pulping troughs. It will be as well to give you Mr. Ibotson's own words on this subject, though even his trained opinion must not be accepted as conclusively proving that mana-grass cannot be utilized for the purpose desired, because so much might follow as the result of chemical admixture during the boiling process which is antecedent to those undertaken at the Poyle Mills. Opportunity has not yet occurred for me to learn what the chemical experts may think on this special point, and speculation by myself as to possible remedial treatment had better therefore be omitted, though I can see no insuperable obstacle to its success in anything that Mr. Ibotson has written me. The following are the terms of that gentleman's letter to me:—"Poyle Mills, Colnbrook, Bucks, September 2nd, 1890.—My dear sir,—The treatment of the mana-grass with edge runners certainly improved it a great deal; for whereas we could not at the first trial without edge runners get the stuff to mix with the water at all, on our subsequent trial after being put through the edge runners the fibres mixed with the pulp and worked very well on the cylinder.

"But there was no alteration in the making of the board on the winding cylinder. The fibres or stalks appear to be too hard, and will not felt together into a board. We made two long trials on two separate days—one was of the grass alone, and the other of the grass with boiled starch added, but in neither form could we get a single board that would hang together so as to be taken off the roll. We obtained a few pieces, but that was all; there was no consistency in it to make the board hang together.

"Mr. Stanley and Dr. Evans came down and saw the stuff on the machine. We shall send up to the Syndicate the boards—such as they are—with all pieces that seem likely to throw any light on the subject. But our own opinion is that the grass is a very troublesome material to treat, and that any process that would render it suitable for making into boards would be found a very expensive one to work.—Yours very truly, (Signed) H. P. Ibotson."

Mr. Thomas Christy, F. L. S., who has on so many occasions obliged me with his valuable opinion as to the nature and properties of Ceylon products, has just shipped this week from the London Docks to a Portuguese trading colony on the Zambesi the largest consignment of economic plants which has even left this country to a single order. The plants shipped included coffees, teas, cocoas, peppers, and vanilla, all plants in fact which have formed leading products among yourselves. Mr. Christy selected and packed all the specimens, and he views it as a singular fact that the Portuguese should be compelled to turn thus to the English to assist them in developing the resources of their African territories. What a change this is significant of that has arisen since the Portuguese were the chief colonizing power of the world!—*London Cor.*

LAWES' CHEMICAL MANURE.

The ordinary meeting of this company was held this afternoon at the New Corn Exchange Hotel, Mark-lane.—Mr. W. Colchester, who presided, moved the adoption of the report stating that the net profit for the past year amounted to £25,877, added to which was the balance brought forward, making a total of £33,692 available for distribution. Out of this sum the directors recommended dividends of 7 per cent. on the preference, and of 10s per share on the ordinary shares, carrying £2,500 to the reserve, and writing £5,000 off the land, plant, and goodwill account, leaving £7,739 to be carried forward. During the past year six of the company's acid chambers at Barking had been renewed, and a proportion of the cost charged to revenue. The remainder, amounting to £3,755, the board proposed to write off in equal amounts during the next two

years. The directors had commenced to erect some additional sheds at the works to enable them to store the raw materials required in the manufacture of manure in such a manner as would prevent the necessity of their removal after once being discharged. By this and other means the board hoped to reduce the increase in cost of production caused by the higher wages conceded to their workmen during the past year.—The report was unanimously adopted.—*Globe*, Aug. 29th.

NATIVE PERUVIAN COTTON.

The United States Consular Agent at Payta says that, after five years of drought, the province and State of Payta are naturally depressed in the way of commerce and all kinds of industry. The valley of Chira forms a favourable exception. The production of the valley consists principally of native Peruvian cotton (*Gossypium herbaceum peruvianum*,) an article used very extensively in Europe for the manufacture of woollen goods with which it mixes readily, on account of its rough, strong, and long fibre, is produced abundantly throughout the State after the rainy seasons, which are periodical, and occur generally every seven years, and is cultivated always along the banks of rivers, on lowlands irrigated by the overflow of streams. The plant is arborescent and perennial, and after fully developing continues producing cotton for five or six years in succession, provided there be some moisture in the ground, needing, however, very little of it on account of its deep rooting, thus reaching moisture at great depths. The system of cultivation of this plant is quite primitive, the seeds being planted by making holes in the ground with spades, without tilling or manuring the soil. The plant becomes developed and begins to bear cotton in dry and sandy soil about six months after planting, and about nine months in rich and wet land, continuing to yield at short intervals for five or six more years in succession. The plant may be observed in blossom, with pods, buds, and cotton all at the same time, and giving a continual yield for the time above stated. In certain seasons of the year, about every seven years, the rains are incessant for about two months, both in the interior and on the coast, and water descends in such abundance as almost to inundate the country. Large torrents stream down the mountain side, the valley of the Chira is deluged, flat lands within it are turned into morasses, and morasses into lakes; in fact, the lowland becomes submerged, and the accumulated mass of waters rush with great force down the central valley which forms their only outlet. The valley, however is wide, and the descent very gradual. The extent of the valley through which the water flows is from three to four miles wide, and although it is nearly 200 miles in extent, the valley for the whole distance is almost level. The rains generally cease in March, but it requires from thirty-five to fifty days for the water to disappear and leave the land dry. As soon is that is effected there springs up, from the whole surface of the ground which has been thus submerged most luxurious vegetation. The soil is wonderfully rich, and has been under cultivation by the aborigines from time immemorial, and its fertility is kept up unimpared by the slime which is abundantly deposited during inundation. The cotton is collected, when the pods open, by women and children, who are paid in proportion to the quantity collected, the prevailing rates being about 1s 8d for every 100 pounds. It is taken from the field to the ginning house, where it is cleaned and made up into bales of about 175 pounds each. There are five of such establishments in the province of Payta, one in Querecotillo, on the east side of the river, owned by an Englishman; two in Sullana, a city of about 4,000 inhabitants, on the west side of the river, owned by natives; two at La Huaca, owned by an Englishman and an Italian. A considerable quantity of cotton is annually exported, and seeds are now also exported for oil-making, Europe is the market for both products.—*Manufacturer and Inventor*, Aug. 20th.

RUBBER COLLECTING IN THE AMAZON VALLEY.

A correspondent, signing himself M. C. M., writes to the *Daily News* as follows:—

May I be allowed to speak a word of warning through your columns, to any young men who might be induced by the offer of a high salary to go out to the interior of South America? Last autumn four young men were induced by a wealthy Spaniard, who was visiting Liverpool and Manchester, to go out with him to his estate on one of the tributaries of the Amazon. They found when they arrived there that it was a rubber plantation worked by slave labour, and that two of them were expected to act as overseers. It is not, indeed, slavery in name, for payment is given in the form of a nickel token, with which the labourer buys his rations; but it is compulsory labour, extending to mere infants, and enforced by the cruelties of the lash, and sometimes of the rifle bullet. The English nature of these young men revolted against such a system and they resolved to escape on the first opportunity. Two of them succeeded in doing so, and are now in England, eager to tell their story to save others from being similarly deluded, and if possible to stir up an agitation which may lead to the deliverance of the poor oppressed natives. The third (a near relative of my informant) was drowned by the upsetting of a canoe on his way down the River Madeira. The fourth was unable to accompany his comrades, being ill of fever when they left. I write this in the hope that their fate my deter others from venturing into an unknown region among strangers, unless after searching inquiry they can obtain satisfactory assurance as to the kind of work required, and the character of those who engage them.—*India Rubber Journal.*

SOUTH AFRICAN EXPANSION.

About a month ago Mr. Stanley when referring in laudatory terms to the Anglo-German agreement used these words :—" You have a glorious tableland, and you are in the heart of Africa. So I see now prospects by which British people could breathe in the heart of Africa, whereas before I was very doubtful whether colonists could live there and multiply there as they have multiplied in America; but I see now a possibility, because you will have the whole slopes of Kenia, that magnificent tableland rising to 7,000, 8,000, or 9,000 ft. You have also Mfumbiro, the Mountains of the Moon, and that great escarpment of marl stretching right up to the neighbourhood of the fortress station of Baker. All that territory is fit for colonisation—900 miles in length and 700 miles in breadth." Yet this territory is traversed by the equator. We thus have the great explorer's testimony to the fact that British settlers can be expected to live and multiply under the vertical sun of the line, provided that the country they occupy is at such an altitude above the sea level that the effects of equatorial heat are qualified and neutralised. Heat in a rarefied atmosphere is not only bearable but is compatible with salubrity of climate and vigour of life. This view is corroborated by observation in other equtorial regions—in Peru, in Ceylon, and in the Eastern Archipelago.—*Natal Mercury*, July 30th.

EXPERIMENTS which have lately been made in the Madras Presidency in the treatment of rinderpest with solid cinchona febrifuge, have been encouraging. Out of twenty-two cattle experimented on, fifteen recovered, one was relieved, and only six died. The inspector of cattle diseases says that the drug reduces the temperature very considerably in the first stages, but that in an advanced stage it is of little or no use.—*Indian Agriculturist.*

THE STEEL ROPE MOTOR: A NEW DEPARTURE.

We call special attention to the following account of the completion and success of the first steel rope motor or conductor of power, utilized in Ceylon. Mr. N. M. Adam, who has seen the Roseneath machinery at work, expressed the opinion to us that the principle is capable of being applied for steel ropes travelling very much longer distances than in this case. There is no reason indeed why steel ropes from a huge turbine, or series of turbines, below St. Clair, Devon or other falls should not be carried to Factories in half-a-dozen directions, for distances up to a mile or so?—We heartily re-echo the regret felt that the respected designer—that able and good man, Mr. John Walker, did not live to see the successful issue of his Roseneath proposal.

(*Communicated.*)

Ceylon is not generally behind other tea-growing countries; but it has been so in the matter of conveying power from a distance by means of a wire rope, and utilizing it for driving purposes. We have had wire shoots and tramways, which have done excellent service; but for this higher work, although much has been written and talked about it, the planters somehow have fought shy and been chary of introducing it. At Darjeeling, as well as at home and elsewhere, it is not uncommon to see the steel rope carrying power from a distant point, and this too in a highly successful way. Here however, a good deal of money will rather be expended in excavating a bad site for a factory so as to bring *it* to the power, than the other way of bringing the power to the factory; and if this can't be done, well an engine is gone in for, which needs constant feeding, and the cheap water motor is sighed over and neglected.

The first introduction to Ceylon of a wire rope arrangement has been made at Roseneath estate, Kandy, and has turned out a complete success. It was during the last visit of the late Mr. John Walker, founder of Messrs. John Walker & Co., that the matter was talked over and arranged for; the details and plans being in the hands of Mr. John Grieve of Messrs. Walker & Grieg. Those who know Mr. John Walker, and have seen how this his last work in Ceylon is as eminently successful as aught else he set his mind to, have considerable regrets that he is not alive today. He would certainly have been satisfied.

Roseneath has no firewood and but a small water supply, so to make the most of what water there is was a necessity. The factory is built on a suitable site at the top of a fall of 70 ft.—the ground, which is very rocky, sloping gradually away from the factory. To utilize this fall the turbine had to be placed a considerable distance from the factory. The turbine is supplied with water from a dam and is regulated at the roller. So that the whole arrangement is well under command and no water need be wasted. The wire rope which transmits the power from the turbine is nearly 400 ft. long, and is carried over a cart road. There was a fear that this might be an objection, as the noise might frighten horses; but so silently does the rope slide along that it can scarcely be heard.

The difficulty of adjusting the rope to suit the change of temperature, and the wear, is got over by means of a very ingenious, efficient, and *automatic* arrangement. Had this been known to the railway engineers at the time they were struggling with the wire shoot at the Blackwater slip, most of their difficulties would have disappeared.

There was one point which caused some fear and trembling. That was the possibility that the rope itself would absorb much of the power. This however has turned out only nominal: so easily is the rope driven that four times more power can be taken out of the water than was formerly developed by a water-wheel. Messrs. Walker & Greig have the credit of erecting the first steel-rope motor in Ceylon; and, as has already been said, they have done this most successfully. Mr. John Grieve, who has seen to the erecting, and generally supervised the work, is fairly justified in feeling not a little proud of it.

TROUT FROM NUWARA ELIYA.

Mr. Le Mesurier's experiment in trout breeding is producing good results when he is able to give out lively good-sized trout to stock other streams. Last week, Mr. Nock of Hakgala got no less than 32 of such trout to carry down and place in the "Sita Ella"—the romantic as well as beautiful stream (a big "burn" in Highland terms) which derives its name from the traditions which fill the neighbourhood with the names of Rama, Ravana and the Queen Sita. Mr. Nock most carefully discharged his duty and was rewarded by seeing all the trout swim away as lively as possible, in the sheltered pool into which he placed them. Anyone who has travelled down the road to Hakgala may have observed that the Sita Ella is, in many respects, the *beau idéal* of a trout stream with its clear pure water, numerous level reaches as well as tumbling cascades. We trust there will be no interference by natives, (there was a rumour of a Sinhalese with dynamite being heard of interfering with streams towards Horton's Plains: should he be caught, severe punishment ought to be awarded); and as the Sita Ella runs along so public a road, travellers should be a check on would-be depredators. We would fain hope that a full measure of success may attend the trout experiment here as well as in all our higher streams. Already trout of several lb. each are spoken of as having been seen in connection with some of the earlier experiments, and a Straits visitor—an eager angler—wrote to us the other day from Singapore that he was never more tempted than by a fine trout he saw in the Nuwara Eliya stream.

COTTON GROWING IN CEYLON.

In answer to Mr. James Robertson's enquiry, the Hon. W. W. Mitchell is good enough to give the following information:—

Mr. Robertson sent us sample pods about a month ago and I reported on them to him. It is just the *kidney* cotton, that so much has been written about, and I really cannot say more than Mr. Robertson says, that "it is the proper kind for Ceylon." I don't think that seed need be imported, for there are trees in many parts of the country, but they are scattered and no quantity can be got anywhere.

I have been supplying Egyptian and New Orleans kinds free to Government and we have plenty of such, but to their requests for kidney kind I have had to say: "Collect it in the villages through headmen—for I have none."

To that part of Mr. Robertson's letter about oil from seed I cannot reply. It could not compete in Europe and would only do for India.

The S. & W. Co. are selling lots of seed of the other kinds at R2 per cwt. and it seems as if the production of it would all be taken off for cattle feeding.

MR. SCOTT BLACKLAW ON BRAZIL.*

PLANTING AND RAILWAYS—MINERAL WATER SPRINGS AT POSSOS DE CALDAS—THE ARGENTINE REVOLUTION.

We cannot leave Campinas without recording that it was here amongst the wealthy coffee planters that the great agitation for railway extension was commenced, and continued. British engineers, working with British capital, showed how railways could be made and managed. The São Paulo Railway was opened in 1862 to São Paulo, and a few years later to Jundiahy, where they stopped. The wealthy coffee estate proprietors saw the advantage of cheap and expeditious transport for their produce to the seaport, and did not flinch from risking their own spare capital. The Paulista Railway Company was formed, and no guarantee of interest was asked for. The object of this local Company was to continue the line westward on the same gauge. Starting where the British Company left off at Jundiahy, they had their first section opened to Campinas at the beginning of 1873 (28 miles) and to Rio Claro in 1876—56 miles further. They made a branch towards the north from Cordeiros, a station south of Rio to Claro, and this they extended until they have now 150 miles opened.

To give traffic for their line they removed several obstructions on the Rio Magyquassú—a river at the terminus of the branch—and put on it steamers of small draught to tow barges which ply for some 100 miles towards the west. The Company has paid an average of 9s.

Campinas continued to be the centre of railway agitation, and it was here that the great Company Moggana was floated and a metre gauge adopted. The first section of forty miles on this narrow gauge—the first which was tried here—was opened in 1875. The writer of these notes was present on that occasion. It was considered so important an undertaking that the Emperor and Empress came from Rio to *do* the opening.

I well remember how surprised I was to see the small American locomotives and the small saloon carriages, long and projecting over the wheels. Little did any one then think, that in a few years the same Company would carry their line far into the northwest of the Province and into Minas and have by the end of 1888 - including branches—a length of 500 miles. The Stuana Railway I have already mentioned, as going in a south-westerly direction from Jundiahy. It was commenced and continued about the same time as the Moggana, on a metre gauge, and as already noted has with its branches a length of over 100 miles: the actual length is 113 miles—but it has not paid so well. The districts through which it passes are not so suitable for coffee, but cane and cotton grow well. Both cotton and sugar have fallen considerably in price, and were it not that there is a local demand for the fibre, to supply three or four local cotton factories, the cultivation of cotton would be entirely abandoned. Cane—whose juice is oftener turned into rum than into sugar, pays the cultivator fairly well, but depends for its success on the local demand for inferior sugar, and rum. A great deal of Mascava sugar and molasses rum from the northern ports are imported into Santos for consumption in the Province of São Paulo. There are three large central sugar factories which although worked at a loss first few years are now paying fairly well.

The Sorocabana Railway branches off from the town of São Paulo, goes south-west, through cane and cotton districts, and in the meantime stops at Botucatu, a rising coffee district. It has already opened 233 miles, and is extending some 150 miles southwards towards the river Paranapanema, where in anticipation large blocks of land have been bought up. The river Paranapanema is the division between the province of São Paulo and that of Parana. The country on the sides of this river has not been explored, and consequently there are a good many Indians who may give trouble to first settlers. Notwithstanding this, land-seekers are looking towards it, and Land Company schemes are being organized to buy land from the Government. This soil is said to be good on the high lands for coffee cultivation and there are millions of acres in the plains suitable for pasture. I cannot say that the Sorocabana railway has paid well, there is a sort of mystification between original shares, preference shares, 1st debenture stock, 2nd debenture stock &c., &c., but they always always keep on extending, and with the opening up of the "Wild West" of São Paulo and Parana. I feel certain the shareholders and debentureholders will have a secure investment. I have already mentioned the Braganea Railway striking northward from the São Paulo Railway 30 miles from São Paulo. It goes northwards to coffee districts and measures about 33 miles.

The Paulista Company, which I have already mentioned, had extended to Rio Claro directly west and to the River Magyquassú to the North of Rio Claro, and although they had the preference to extend west preferred to from the latter place. They give their attention more to the opening of the river navigation I have mentioned than to extending the railway beyond Rio Claro westward. The cry of the planters had to be listened to, and the Rio Claro Railway Company was formed to carry a meter gauge line from Rio Claro westward, and with branches this Company now have a length of 165 miles. The line has paid well, and has only a few months ago (June or July 1889) been bought up by a British Company at a handsome profit to the Brazilian shareholders. This line has a bright future before it, for its zone extends also toward the rich *terra rocha* and pasture plains in the west of São Paulo, and to the Province of Mattagrossa. At present the communication between the last-named province and the Capital of the Empire—or even the Capital of São Paulo—is by *sea via* the River Plate. The lands in Mattagrossa are said to be good for coffee, cane, cotton and tobacco and cereals. In the forests are mate, rubber, copaiba, and cinchona, with a host of other industrial and medicinal products. An excellent quality of wheat can be grown, and the high elevation of the great plateau, extending from the Serra de Mar to the foot of the Andes, has a climate which European people can work in and live in.

The following is a list of the railways which have been made since 1873 when the present writer arrived in this province for the first time. At that time only 120 miles were opened, the São Paulo Railway from Santos to Jundiahy 93 miles, Paulista from Jundiahy to Campinas 27 miles. Now there are Rio de Janeiro and São Paulo Railway from Cachoeira to São Paulo starting from the end of Sao Paulo branch of D. Pedro 20...141 miles

"Sorocabana" from São Paulo passing Sorocaba	...233	"
"Bragantina" branching off São Paulo Railway	... 33	,,
"Stuana" from Jundiahy passing by Stuana	...113	"
"Paulista" from Jundiahy to Rio Claro and branches	...150	,,
"Rio Claro" from Rio Claro to Araraguara and branches ...	...165	"
"Mogyana" from Campinas, passing Mogymerim and branches ...	...500	"

* From notes in September 1889, supplemented in July 1890.

Or in round numbers 1,300 miles of railway since the agitation was begun at Campinas sixteen years ago. We all remember the great rise that, about these times, 1873-5, took place in the price of coffee. The leaf-disease had not taken such hold on coffee trees in Ceylon, there were hopes that a cure might be found, or that it might leave in the same mysterious way that it came. Brazil was then looked on as the great rival of Ceylon. In these times your readers seemed incredulous at the figures I gave in estimating coffee crops to be shipped from Rio and Santos, but we were always at one in calculating the great benefit to this country and to your own of railway extension. And how much have all our estimates and calculations been exceeded as regards Brazil in both of these? But, alas! owing to that leaf-disease calamity, Brazil is no more the rival of Ceylon, and the impetus which railway extension has given to coffee production in São Paulo does not interest you since the cultivation of the valuable bean is not your stand-by any longer. In any case looking at the subject from an economical point of view, the same arguments showing that railway extension is the most important factor for the increase in production, can be applied to any country. Let us look at the figures for São Paulo as applied to coffee alone. At the same time *all* of these railways, which I have given you a list of do not depend for traffic on *coffee alone*. In many cases, in particular districts, where little was expected owing to their being out of the coffee zone, large quantities of other things, such as cotton, cane for central factories, Indian corn, beans farinha, lime timber, stones (flags or slates), and a host of things, that no one formerly thought of being transported, have contributed to make receipts exceed expenditure. The same thing would take place in Ceylon, were your colonial authorities to reverse their stick-in-the-mud policy, and spread a net work of railways over your luxuriant island. Leaving out your mountain zone, there is no reason why railways to Mannar, Jaffna, Trincomalee, Batticaloa, and right through Bintenna, could not be made as cheap as in Brazil—£3,000 per mile. Many things which would contribute to give traffic, we do not dream of at present, both from the interior to the seaports and from the seaports to the interior. Given means of transport, a healthy climate, good soil, an energetic class of men to direct, and there is no end to the resources of a new country; and you have all these factors.

But let us return to São Paulo.

In 1860-61 just before the Santos-São Paulo Railway was opened:—

The export of Coffee from Santos was	82,608 sacks
In 1876-77 just as the first metre lines were being extended ..	628,898 „
In 1888-1889 with the mileage I have given above	2,641,706 „

Each sack holds 60 kilograms of coffee, and 1,790 to a ton.

Let us give all honour to the coffee planters around Campinas for seeing the great advantage the railway system was to bring them, in a cheap and expeditious means of sending their produce to market, and for their courage in risking their spare capital in these metre gauge railways. What though these projects were to open up parts which were almost geographically unknown, huntsmen, wandering pedlars and pack-mule men could tell of large blocks of forest at such an elevation above the surrounding grassy plains as to be entirely free from the visitation of frost; and they with beaming eyes would listen to eloquent descriptions of the enormous size of and produce from some few coffee trees, near some native hut in the interior; and then the *terra rocha* was always richer the farther west one went. Wherever a railway was projected, land seekers would flock, land would be bought, forests felled and burned, coffee planted if not with plants or stumps then with seed, enormous crops of Indian corn would be taken off the land while the coffee plants (put in 12' by 12') would be growing, beans, and rice would be grown largely, houses would be built which would be the nucleus of luxuriant palacettes to be. Villages would spring up, churches, post offices, tax-collector's offices, would follow, and soft, hard and dry goods storemen would flock to the centres and build huts in which to vend their wares. So that what a short time ago was a waste wild as the dark continent would soon be turned into a flourishing country-side, so that by the time the railway would be opened traffic would be ready for it.

But what about the working population for the development of all this? Well, we shall see as we get further on. Meanwhile we are embarked—as they have it here—on the great metre gauge railway at Campinas. This Mogyana railway, which has given 14 per cent from the commencement to the shareholders and every year added a large sum to its reserve fund, which by its results owing to economical construction, and good traffic management has enamoured the people of this country with metre gauge railways.

In Brazil after this great success no other gauge is thought of, and only the first made line, the Dom Pedro 2o, and the São Paulo, with the continuation the Paulista, are on a wide 5' 3" gauge. The extensions of the great Dom Pedro 2o, are now made on a metre gauge, and at the time the Government took this new departure with its own line, it was only after an agitation by the Club of Engineers of Rio de Janeiro that the authorities were prevented from tearing up about 100 miles of broad, and putting down a narrow, gauge. Although I have all the discussion of the Club in my possession I do not care to revive the subject: how often has a discussion of gauges hampered the promotion and delayed construction of useful railway lines!

But after this long digression, let us continue our journey along the Mogyana railway. Up to Mogymirim, some 45 miles, there is nothing worthy of note; the country is undulating and owing to this the line is very crooked. The exploring engineers seemed loth to lose the side of a small stream when they found one, and unwilling to lead the trace where deep cuttings and heavy embankments would be necessary. As should be in tropical countries the waterways are ample, open culverts being the rule. Bridges were first made of timber, but are now being replaced by iron. In large bridges, which are very few, preference seems to be given to the American truss system. Now and then a ridge higher than the ordinary level of the surrounding country has to be crossed, and there we see coffee fields. The current crop is nearly all picked, (September 1889) and the trees have suffered very much; in fact old coffee trees are left a mass of dry sticks. The late dry season has contributed greatly to this, but the old hand sees it is the result principally of excessive bearing. The dry weather has not prevented the weeds from growing, and although the majority of estates are pretty clean, many are requiring the mamoty. It is astonishing how soon coffee trees planted in *terra rocha* recover vigour after a few showers:

* Better a line on any gauge than none, but the standard gauge will ultimately supersede all others. As we in Ceylon have now over 200 miles of 5' 6' railway made or under construction, our wisdom is not to break gauge.—ED. *T. A.*

drought or heavy bearing does not permanently affect it. All the same on all these coffee estates between Campinas and Mogymirim I prophesy scarcely any crop at all for season 1890-91, that is coming season. Labour seems plentiful enough. The planters hereabout were the first to avail of European colonists—indeed they were in a manner forced to try something, for the exodus of negroes from the cane plantations in the north, or indeed their introduction from any other province was stopped by putting a tax of £100 on every slave entering the province. This was in 1830. Judging by the number of labouring men's houses one sees on all the estates, and the number of European children one sees playing about them, there does not seem to be a scarcity of labour here.

At Jaguary station, 12 miles from Campinas, a branch line of the Mogyana railway goes to Amparo, north-about 20 miles, (31 ks) on the same gauge, to a rich coffee district, and from Mogymirim another branch goes north by a place called Penha to the boundary of Minas Geraes about 35 miles. I may here mention that from the end of this branch a line is under construction which goes along the other side of the Serra Negra, and continues on the west side of the Serra Montiqueira, coming out at Barra de Pirahy on the D. Pedro 2o Railway. It is thought that this new line has a great future before it. It certainly opens up a large extent of agricultural country and will compete largely with other companies for passenger and goods traffic to Rio de Janeiro, the distance being shortened from here to the lastnamed place, some 50 or 60 miles. It will also pass by Caximbu mineral water establishments, the resort of many invalids, and the water springs of Lambary, a sort of Brazilian Seltzer, which is bottled and sent to the large towns.

Mogymirim is a very pretty, clean-looking country town, of some 4,000 inhabitants, and built on rising ground above the level of the railway line. It gave the name to this railway. In these early days of railway construction the Company were doubtful if they could go beyond this district. They soon, however, opened to Casa Branea, making their line 106 miles long from Campinas. On the extension to Casa Branca (*anglice* white house), at 80 miles from Campinas, is the station of Cascavel (*ang.* rattlesnake); from here goes a branch of the same company to Possos de Caldas (wells of Caldas) some 45 miles (77 ks).

Possos de Caldas has been for many years a resort for invalids suffering from various chronic diseases. Sulphurous waters spring out of the ground at a very high temperature. I have for many years had a wish to visit this wells, and you will remember our late lamented friend G. A. C. was to have accompanied me there in 1875, after our shooting excursion to the west, but at this long time I cannot now recall the reasons why we did not go. From where I lived the journey would have taken on mule back four or five days to go; and as long to come back. Now-a-days we have a railway all the way. In the absence of personal observation of this part, I can only give you second-hand information. *Nossa Senhora da saude das aguas de Caldas* (our lady of the health of the waters of Caldas—such is the literal translation) is the name of the village which has of late years sprung up around these thermal springs. The wells have long been known, but being situated in a wild almost inaccessible district, in the south of the Province of Minas Geraes. Few people visited them before the Mogyana Railway was made. Being some 15 miles outside the Province of S. Paulo, it was not within the zone allotted to the Railway Company. That was not the only reason however which delayed the construction of a branch railway to Possos de Caldas. The country is barren, sandy and rocky, and offers very little prospect of traffic, for goods of any description. The soil is not suitable for coffee, and the pastures are not fit for fattening bullocks. The Company got a guarantee from the Government of 6 per cent per annum. The line has not been open for more than a year, and in that year the receipts were some £2,000 less than the expenditure. The Company were thus justified in being reluctant to make this branch sooner. Here are the figures in Brazilian money. You will see that coffee is nowhere and animals are a small item:—

Passengers ..	..R52,398	$43
Parcels and baggage	.. 4,708	520
Animals ..	.. 366	340
Carriages ..	... 3	900
Merchandise ..	.. 41,613	440
Telegraphs ..	.. 1,723	620
Store Rents ..	.. 19	000
Accessories ..	.. 354	710
	R101,181	960
Expenditure ..	.. 120,591	450
Deficit ..	..R19,409	$499

The merchandise mentioned, there would be general goods, to supply the local stores, hotels, vendas, &c.

The Company after they saw the line was not paying commenced to run the train once in two days, but a paternal Government, anxious about the health of its people, ordered daily trains, and as Government guarantee 6 per cent of course they are bound to run them. The attractions of the place in these wild hills, at an elevation of some 4 000 feet (1,200 metres) above sea-level, ought to draw many passengers bent on pleasure only, but the unfortunate thing here is that the hot season which ought to send people to the hills is in this country always the rainy one, and the uncomfortableness of these hilly regions in wet weather is in the inverse ratio of their pleasantness in fine. Still enterprizing hotel-keepers offering comfort and luxuries at a fair price, which is rare here, ought to draw many visitors; and I have no doubt when the usefulness of these sulphur baths is better known, tourists and invalids will come from all parts of Brazil and from other countries to test their efficacy. Their history may be summed up as follows:—Some time during the last century when Brazil was a Portuguese colony and very thinly populated, some huntsmen on their chase after tapir, deer and wild boar were led by the accidents of the chase into a small valley surrounded by high hills. At the sides of this valley they discovered some earthslips, and noticed sulphurous warm water oozing through them. It was afterwards found that these springs were almost similar to those at Caldas in Portugal. This gave the name to a town which sprang up some 15 miles to the east, about 1813, and which is now the city of Caldas, and the county town of a large district. The efficacy of these waters in curing rheumatic disorders was known before the year 1815, for in that year a wealthy planter who had been obliged through sickness to experiment on his person their effects, set about purchasing a square Portuguese league of the land (16 square miles Eng.) with the springs in the centre. The Provincial Government laid claim to the land, but the original deed on which they relied, dated 1795, could not be found, only a copy of it. The proprietor found difficulty in retaining quiet possession. In 1865 the rights of the Provincial authorities were again agitated, and to get rid of the annoyance the owner or occupier gave, by deed of gift, some 250 acres (26½ alqueires) in which was included the land on which were the wells and the village, and to settle the question once for all the Pro-

vincial Assembly in 1870 authorized the President to disappropriate the land, declaring it of public benefit.

In three years the Government spent some £3,000 in trying to make the waters useful to the public, but with very poor results, as the money was spent uselessly. Then it was thought they could be better developed by private enterprize, and a concession was given to Dr. José Caetano dos Santos, and he raised a company in Rio de Janeiro in 1873 under the name of Don Pedro 2o Thermal springs. Unfortunately the Company did not succeed, it is said they did nothing at all and in 1880 Dr. José Caetano dos Santos was notified by the President of the province that his contract was rescinded. After public competition the right to make baths, build hotels &c., was given to some private individuals, who after bartering and selling parts of their rights, and speculating, the proprietors are now reduced to poor persons. It is said that up till now there has been spent by the syndicate from first to last some £40,000.

The syndicate had a good deal to do, for they found the springs in almost their primitive condition, a series of holes full of boulders and mud, as the tapir and wild boar had left them. These animals made the same use of them as your buffalos make of a muddy hole or wet paddy field. The first thing to do was to build cisterns for enclosing the springs. There was little difficulty in doing this, as the pudding-stone rock, through which the water comes, was reached at from 3 to 4 feet from the surface. The names of the first three so enclosed are *Pedro Botilho*, *Chiquinha*, and *Mariquinha*. There was greater difficulty in the canalization, for the water could not be taken far without losing heat on the way to the baths. This was successfully effected: the water of these three springs was united and conducted in pipes to the bathing establishment by gravitation. This was in 1882. The temperature of these three is from 44° to 45° (Centigrade 112° to 113° Fahr): at the springs and baths can be taken at the establishment at 37° Cent. (98° Fahr.), which is blood heat. There is another fountains some 600 metres further away named *Macacos*. The baths from it are taken at 35° Cent. (or 95° Fahr.). At the fant this one has a temperature of 42° Cent. (107° Fahr.) It is of this one that water can be *drunk* if so ordered. The rule seems to be to take a bath at the general baths during the day and in the cool evening take a walk to *Macacos*, to have a drink, the distance from the bath-rooms to Macacos being 600 metres —about a third of a mile; but as I said above the water from Macacos is also canalized and brought to the bathing establishment losing some of its heat on the way. The two cisterns of Macacos water at the bath-house hold 4,500 gallons each.

Residual analysis.

Sulphuric acid	...0·0566
Silica	...0·0200
Carbonic acid	.. 0·2293
Chlorine	...0·0042
Lime	...0·0110
Potash	...0·0165
Soda	...0·2973
Organic matter and stones	...0·0191
Magnesia and iron traces	...
Total	...0·6540

As to gases 10 *cc*, 6 were encountered per litre being the same at all the fonts. (sulph hydric acid) nitrogen and sulphurated hydrogen in equal portions.

Interpretive analysis of 1 kilogramme of water

	Grammes
Sulphate of potash	...0·0305
Sulphate of soda	...0·0756
Chlorurete of soda	...0·0069
Carbonate of lime	...0·0195
Carbonate of soda	..0·4450
Silica	...0·0200
Sulph hydric acid	...0·0027
Nitrogen	...0·0013
Organic mater and stones	...0·0191
Carbonate of magnesia traces	...
Carbonate of iron traces	
Total	...0·6206

The complaints the waters are said to cure, or to assist medical treatment, are scrofula, chronic rheumatism in all its forms, chronic bronchitis, catarrh of the lungs, asthma, diabetes, functional paralysis, female complaints, and effects of mercury in the system.

The visitors to Caldas are not confined to those suffering from the above, but it is beginning to be looked on as a sort of resort for people who feel seedy, and for families going to spend a month or six weeks for a change of air. There are nice views from the tops of the hills which surround the little town, and being 4,000 feet above sea level, the climate in the hottest part of the year (barring the rain) is very agreeable.

Visitors from Rio if they go by rail spend one night in S. Paulo and next afternoon they are at the wells. Return tickets are given which extend for a month, these would not exceed £7 for first class: the hotel and bath charges would be about 12 shillings per day.

I have mentioned that the rock through which these waters come is a conglomerate, or pudding-stone, composed of gravel and stones of various sizes with a binding matter of hydrosilicate of lime. The geological formation is no doubt volcanic.

But let us return to our journey and our old friend coffee whom we seem to have last sight of. From Moygmirim to Casabranca at which place we arrive after a run of some 27 miles from Cascavel (where the junction of the Caldas branch is); very little coffee is to be seen. The land is what is called campo, undulating, and covered with illuk grass. These campos are burned every year whether it be the owner's wish or not, if he do not set fire to them, some mischievous person does. These fires are dangerous things, for often forest land and dwelling-houses get involved in them, and there is no way of finding out who the fire raiser is. Of course one may expect that this keeps the ground in a dry baked state, and not fit to grow any kind of crop. The young herbage which shoots out from the roots of the burnt grass is very sweet and is greedily eaten by cattle, horses and sheep. I should say that nine-tenths of the land one sees along the line from Mogy to Casabranca is of this class.

At Casabranca commences the new districts for coffee which were begun to be cultivated after the railway agitation mentioned above. The great pioneers here were the family of Prado. Antonio Prado who was for some time Minister of Agriculture and Martinho Prado, junior, who was Provincial Deputy, did so much to encourage immigration of Europeans, and was the means of effectually putting an end to buying and selling slaves, being the agitator for levying a heavy tax on all slaves entering from other provinces. These two and their father Martinho Prado, senr. were amongst the first to give unconditional liberty to their slaves before the emancipation law was passed, and finally they were the foremost advocates for unconditional liberty being given at once to all which I have already noted. But as this letter has run out to a length which may try your patience I must leave what more I have to say for another occasion.

Rio, July 28th, 1980.

P. S.—I intended to have given you some notes on our political situation, but the 'John Elder" has come in, and goes away sooner than I expected. The Republic of Brazil is doing well. I have some notes and translation in pencil on the constitution, which will be revised by the constituent assembly in November next, but I shall write them out for the New Zealand steamer on 31st.

Our Financial Minister, in spite of great opposition from all commercial classes, is adhering to his decree of obliging 20 per cent of import and export duties to be paid in gold at 27d per *milreis*, while paper is valued at 22½d at present. It is calculated that each farthing up or down of exchange counts 1 per cent more or less of duty. This will make up as total tax *ad valorem* on imports of some 50 per cent on most European goods, —unless agricultural machinery, which has to pay 6 per cent emancipation tax.

A fearful revolution has broken out in our neighbouring republic, the Argentine, brought on principally through financial mismanagement and robbery by the governing powers—so says the *Proclamation of the Provisional Government* as the insurgents call themselves. At present the *Telegraph* says they are killing each other in the streets at Buenos Ayres—some 300 having been killed yesterday. At present the fighting is confined to the military, but it is expected the people will take the side of the insurgents, who have some battalions of the army and the part of the navy on their side. The *Proclamation of the provisional Government* accuses the president *de jure* of great irregularities, of robbery, bribery, and interference with the liberty of the subject, and the rights of property. Their paper money is at 310 per cent. That is to say for a 100 gold dols: one must pay 310 in paper, and duties have to be paid half in gold. The late President is blamed for the depreciation of the currency. President Juarez elman entered into office poor, and is now said now to be a millionaire: the same with other members of his Government. The head of the revolution is General Campos, who has already proved himself a brave officer in the wars, but Leonardo Allem is put forward as President, a respectable citizen and honest.

THE CEYLON HANDBOOK AND DIRECTORY FOR 1890-91.

(From the *Aberdeen Free Press*, Aug. 23rd.)

"The Ceylon Handbook and Directory," compiled and edited by Messrs. A. M. & J. Ferguson, editors of the *Ceylon Observer*, has been mentioned in our columns before now. In a supplementary sheet issued with the overland edition of the *Observer* of 28th July, the preface to the edition of the Handbook and Directory for 1890-91 is printed in full. And in it a very hopeful view of the condition and prospects of our leading Crown colony is given. The knowledge and experience gained in collecting information and making all the needed investigations "justifies us," say the editors, "in repeating the expression of the sanguine hope that, during the term of office—1890-5—of Governor Sir Arthur Havelock, Ceylon will have fully regained (through the great tea enterprise) that planting prosperity which was lost through the dire effects of the coffee-leaf fungus in the time of his predecessors; and we further see the promise in our other new industries, together with the continued extension of palm as well as grain cultivation, of a degree of stable comfort and even wealth for the people such as could not be imagined when Ceylon was at the very height of its ancient glory in the days of the great king Parakrama, the creator of 'the Inland Sea.'"

Of the social and intellectual condition of the "Spicy Isle," the editors say:—"We cannot regard with satisfaction the fact that twice as much is annually spent on 'intoxicating drink' in Ceylon as on 'education and the teaching of Christianity'; the proportion being, according to our estimate, between four and five millions of rupees, say £450,000, on the former, and not quite £230,000 on the latter, or less than twopence per head of the population!

"Nevertheless, as compared with India, in public instruction, Ceylon is far in advance, having 1 out of 26 of her population in school, against 1 in every 150 in India; while in England the proportion is now, we suppose, 1 in every 4 or 5. Education is very cheap in Ceylon, and in respect of teaching in the vernaculars especially, a small amount goes a long way; but it is an 'English' education that the natives—both Sinhalese and Tamil—crave after, and it is evident that, *nolens volens*, our educators, whether missionary or Government schoolmasters, cannot help themselves until in a comparatively short time, perhaps before another century dawns, from Dondra Head to Point Pedro, English will practically be found to be the language chiefly used by the people of Ceylon."

THE PROSPERITY OF CEYLON.

Says the London correspondent of the *Glasgow Herald*—a copy of which has been sent to us by a Ceylon colonist:—

One of the most striking economical incidents in recent British colonial history is the prosperity of Ceylon. Fifteen years ago "coffee was king," as the saying ran in that island; Ceylon depended on coffee as absolutely as Guatemala does now; coffee built railways and made roads, paid the taxes and kept up many an establishment at home. Then came the failure, caused largely by the growth of the South American produce and the fall in prices, and for several years Ceylon was on the verge of bankruptcy, and many of the principal planters went down never to rise again. After a short time, tea was tried, with the now well-known result. I have lately seen a return from Ceylon which shows that tea plantations now cover a larger area than those of coffee did in the palmiest days. Tea flourishes where coffee failed. In whole provinces where coffee was tried over and over again with no result, tea plantations now flourish. Tea, again, grows luxuriantly where coffee languished, for it is hardier, and will grow at higher altitudes. "As a general rule, wherever coffee has succeeded best, there also tea has yielded good results. Hence it follows that tea dominates over all the old coffee region, and a vast territory besides where coffee failed." The consequence is that Ceylon has for several years past enjoyed even more than its old abounding prosperity; its revenue shows a good surplus, public works are being steadily continued, and planting is once more profitable. But this time it is under the reign of King Tea.

AN EXCHANGE DIFFICULTY.

To THE EDITOR OF THE "PIONEER."

Sir,—Now that exchange has taken an upward course which it is likely to maintain, I, in common with others of your readers, am somewhat at a loss to know why it has not already gone higher. For two or three weeks past the American Government have been buying silver at 119½ to 119¾ cents the ounce, which unless the American dollar has gone down in European exchanges, is within a small fraction of a penny of the rate at which silver sold in the years before 1873, when the bimetallic ratio of the Latin Union was in force and the rupee was at or about two shillings: yet the rupee is at present worth only 1s. 8½d. Can you explain the discrepancy or rather can you explain how the rupee ever came to be worth two shillings? An ounce of fine gold, I understand, exchanges at the English mint for £3 17s. 6d., and that the old bimetallic ratio of 15½ to 1 makes the price of fine silver 60d., which was practically the rate at which that metal sold for many years prior to 1873. Now a rupee weighs 180 grains and contains about 165 grains of fine silver, which at the above price makes its intrinsic value (neglecting alloy) 1s. 8⅝d. How did it ever come to be worth two shillings?

TYRO.

[Our correspondent has overlooked certain factors in the value of the rupee. The silver in the coin was never worth two shillings sterling: for its value is enhanced over that of bullion by the seignorage of 2·25 per cent which is charged by the Government of India for coinage. One has to add also the cost of transport to India, freightage and insurance, and the loss of interest on the money while it is passing through the mint, a process which generally occupies about 14 days. These expenses are generally taken to add about 3½ per cent to the intrinsic value of the Indian standard coinage. At this rate we get the following table of equivalents, which may be useful to our readers:—

Price of silver per ounce.	*Value of the rupee.*		*Price of silver per ounce*	*Value of the rupee.*	
d.	s.	d.	d.	s.	d.
45	1	5·27	50½	1	7·40
45½	1	5·47	51	1	7·59
46	1	5·66	51½	1	7·79
46½	1	5·84	52	1	7·98
47	1	6·04	52½	1	8·18
47½	1	6 24	53	1	8·37
48	1	6·43	53½	1	8 56
48½	1	6·62	54	1	8·75
49	1	6·81	4½	1	8 95
49½	1	7·01	50	1	9·14
50	1	7·20	65	1	11·7]

Pioneer, Sept. 10th.

NUTMEGS AND WEATHER.

North of Kandy, Sept. 26th.

Some of the nutmegs we have put out show already a growth which has surprised me, knowing as I do the deliberate nature of the nutmegs' advance. On the whole I was more than satisfied with the clearing.

The weather for tea has of late been of a very rough nature. Cold winds taking the tea bush by the throat and demanding that it should deliver. No good got that way. It has been an abominable bad quarter this, but the weather is now turned genial; so we trust to make up later for the backwardness of the past.

THE MADRAS REPORT ON CINCHONAS.

A copy of Mr. Lawson's report has now reached us from the Madras Government. We have already quoted the report from the *Madras Times*, but we now give Mr. Hooper's analyses of the soils:—

From the Government Quinologist, to the Government Botanist and Director of Government Cinchona Plantations, Nilgiris, dated Ootacamund, 8th April 1890.

I have made an analysis of four samples of sub-soil taken from different parts of the Wynaad and representative of that in which the cinchona plants are grown.

The four samples were labelled, respectively—

1 Pallacoon.	3 Carpencnlli.
2 Glenmary.	4 Alexandra.

Separated from the few stones present, powdered and sifted, the samples had the following appearance:—

1 Bright reddish brown.	3 Reddish brown.
2 Dull reddish brown.	4 Brown.

The soils were very similar in mechanical composition. They were ferruginous earths with variable amounts of quartz sand. Nos. 2 and 4 contained micaceous schist. They might be catalogued as light sandy soils, except No. 3, which contained an appreciable quantity of clay, and was, therefore, a sandy loam.

A chemical analysis revealed the presence and amount of the following constituents:—

	1	2	3	4
Moisture	3·64	2 92	2·58	3·24
Organic matter and combined water	11·61	9·24	4·69	6·85
Soluble salts	·11	·13	·10	·02
Alkaline chlorides	·26	·46	·14	·27
Iron oxides and alumina ...	15·77	11·03	7 90	14·11
Lime	·26	·21	·14	·17
Phosphoric acid	·23	·16	·11	·21
Silicates and quartz sand ...	71·58	77·62	85·20	72·87

In comparing these figures with those obtained by the analysis of Nilgiri soils, it is observed that, with regard to the mineral matter, there is a full proportion and there is a fair amount of lime, phosphoric acid and alkalies (potash and soda). The soluble salts are small and they consisted of chlorides and sulphates of the alkalies and alkaline earths. The chief feature in the chemical composition of the soils is the small amount of organic material and the consequently small quantity of nitrogen present. In soils, which I have analysed from the Nilgiris, Gudalur and other places acknowledged to be good for the cultivation of cinchonas, more than double the amount of organic matter and combined water is usually met with. As the greater part of the samples was made up of rocks in a state of incipient decomposition, this will account for the absence of much nitrogenous and carbonaceous substances and the high proportion of silicates and sandy matter.

The results obtained by Mr. Hooper clearly indicate the application of stable manure, or of rotted straw, grass or weeds with some form of ammonia. But at present we fear manuring cinchonas will not pay.

CHIEF INDUSTRIES OF THE MADRAS PRESIDENCY DURING THE YEAR 1889.

[The following summary affords hints of importance as to industries that might be established in Ceylon.—ED. *T. A.*]

Of the important industries carried on in the Madras Presidency during the year 1889, there were six bone-crushing factories, two in the Coimbatore district, one in South Canara, and three in Malabar. Of these four were not worked, viz. Messrs, Pierce, Leslie & Co's in Coimbatore, Messrs Volkart Brothers' and Ouchterlony & Co's at Calicut, and Alston, Low & Co's at Kottayam. Messrs. Stanes & Co's factory in Coimbatore crushed 63 tons of bones valued at R3,162 and the Boloor Works in South Canara, 97 tons valued at R4,075. The Cement Manufactory of Messrs Arbuthnot & Co. at Madras turned out 60,000 cwt of cement, valued at R1,20,000. This factory also makes tiles and carries on the industry of lime-burning. 60,000 tiles, valued at R3,600, were made during the year, and 1,600,000 measures of lime, valued at R11,040. Of Coffee curing works twenty-three are returned viz., two in Coimbatore, five in South Canara, ten in Malabar and six in Madura. The most important is Messrs. Volkart Brothers' Works at Kottayam which turned out 4,724,720 lb. valued at R20,82,294, followed by Messrs. Pierce Leslie & Co.'s works at Calicut, which produced about R12,97,949 and Messrs. Arbuthnot & Co.'s Plantation House Works showing an out-turn of R9,00,000 for Coffee and R1,07,711 for Cinchona. The three works in Coimbatore—Messrs. Stanes & Co's, Messrs. Pierce, Leslie & Co.'s and the Jeppu Coffee Works—are worked by steam power. The works of Hinde & Co. and Pierce, Leslie & Co. at Kottayam show a falling off in the out-turn as compared with last year owing to the fact that coffee-producing districts (Coorg) on which Tellicherry mainly depends for its supply of coffee suffered much from the leaf-disease, which seriously affected the produce. Of cotton presses and cotton weaving establishments other than mills there were forty-three viz. three in the Kistna District, two in Cuddapah, three in Anantapur, seven in Bellary, one in Trichinopoly, ten in Tinnevelly, eight in Coimbatore, four in Malabar, and five in South Canara. The most important works were those of Milligan & Co. in Tinnevelly, with an outturn of 1029,7,000 lb. of Cotton, valued at R27,60,190, besides 329,700 lb. of cinchona, valued at R61,819. and 151,400 lb. of senna, valued at R7,550; the Fort Press, Tuticorin, with an out-turn of 7,874,000 lb. of cotton valued at R21,57,476, besides 546, 800 lb. of senna valued at R43,744; the Tuticorin Cotton Press Company, Limited, out-turn 5,929,500 lb. valued at R15 17,952; Dymes & Co.'s. Press at Adoni, out-turn 6,008,606 lb. valued at R13,96,532; and the New Berar Company (Limited) in Tinnevelly, out-turn

4,760,000 lb. valued at R13,18,400. Messrs. Groves & Co. had a flour mill and bakery on the Nilgiris, the annual out-turn of which was R15,000. There were only two Ice Factories, those in operation in the Presidency town. The Madras Ice Manufacturing Company turned out 606 tons valued at R33,855 and the South Indian Ice Company, 268 tons valued at R12,504. As regards the manufacture of Indigo there were 44 factories in Salem and six in Ganjam. Forty-nine vats in Vizagapatam, 40 in Godavari, 1,408 in Kistna, 1,465 in Nellore, 1,021 in Cuddapah, 203 in Anautapur, 23 in Bellary, 794 in Kurnool, 272 in Chinglopnt, 569 in North Arcot, 465 in South Arcot and 40 in Trichinopoly. There were six iron and brass foundries, viz. one on the Nilgiris, two in Madras, one in South Canara, one in Trichinopoly and one in Godavari. The number of mineral and Aerated Water Manufactories are returned at 32. One Indian Condiment factory alone is returned for Madras, that of Messrs. P. Vencatachellum & Co. Messrs. Stanes & Co., have an Oil-cake press at Coimbatore and Messrs. Alston & Co., in Malabar. There are sixteen lamp-oil manufactories in the Godavari district with an aggregate out-turn of 9,903,037lb. valued at R10,06,398. Only one Rice-Mill is returned, belonging to the Coringa Rice Mill Company (Limited). There were 5 Coir Works, four in Malabar and one in South Canara. The Mylitta Silk Mills Company (Limited) carries on work in Madras and Coimbatore; the out-turn was 1,920lb. of tassar silk thread, valued at R21,120. Five Sugar Factories are returned, one at Aska and four in South Arcot. The Aska Factory turned out 26,896 cwt. of sugar, valued at R3,58,620. Of tanneries conducted on the European system thirty were at work, viz., three in Madras, one in Bellary, 14 in Madura, three in Coimbatore and two in Trichinopoly. There were 11 Tile Manufactories in South Canara, two in Malabar and one in Madras. Messrs. Groves & Co., possess timber mills on the Nilgiris, and the Basel Mission has carpentering works in Malabar. Thirty-two Cigar Manufactories are returned, viz., 18 in Trichinopoly, four in Madura, nine in Godavari and one in Malabar. Of these the most important are John Heimpel's Cigar Factory, Dindigul, with an out-turn of 5,000,000 valued at R75,000 Spencer & Co's., T. B. Arumuga Mudaliar's and Ibrahim Khan's of Trichinopoly, the out-turn of each firm being returned at R75,000.—*Madras Times.*

BOOK NOTICES.

GEMS AND PRECIOUS STONES OF NORTH AMERICA. By Geo. F. Kunz; illustrated, 336 pages, size 7½ x 11 inches. Ornamental cloth cover. The Scientific Publishing Co. Price, $10.

Two years ago popular interest was awakened in the subject of the precious stones of this country by an illustrated article in *Harper's Magazine*, by Geo. F. Kunz, gem expert, with Tiffany & Co. Last year Mr. Kunz was in charge of the exhibit of precious and semi-precious stones sent by Tiffany & Co. to the Paris Exposition, part of which is now in the Museum of Natural History in this city. The exhibition attracted world-wide attention and won for Mr. Kunz a gold medal and high honors. An indefatigable student, he stands foremost in his line; Special Agent of the United States Geological Survey, member of the Mineralogical Society of Great Britain and Ireland, the Imperial Mineralogical Society of St. Petersburg, the Societie Francaise de Mineralogie and other scientific bodies.

The Harper article and the exhibit paved the way for the appearance of a sumptuous volume, an *edition de luxe*, illustrated with eight colored plates, each one of them a revelation of the wonderful skill of the printers in color, and attesting the great advance made in that art since the days when the country went wild over the now much despised chromo. The work is a popular description of the gems and precious stones of North America, of their occurrence, value, history and archæology. It also contains a history of the collections in which they exist, a chapter on pearls and remarkable foreign gems owned in the United States. We recall no work in which the subject of precious stones, mineralogy and archæology have been so closely associated.

Thus far, searching for gems has not figured, in American industrics, save in two States—Maine and North Carolina; and yet, Mr. Kunz tells us, nearly all the known varieties of precious stones are found in the United States. The eight plates in colour furnish fac-similies of many of the gems found in this country. One lingers in admiration over the illustrations which have a depth and brilliancy and fidelity to the originals that is remarkable. Plate 7 is a reproduction of drawings—A., Rutile in quartz cut heart shape (Venus hair stone, Fleche d'Amour, Sagenite) found in Alexander County, North Carolina. B. Smoky quartz, from the same locality. C. Rutile in quartz, West Hartford, Conn. This latter is a superb bit of work, the smoky, almost clove-brown color being closely copied, while the crystals of varying size, from the fineness of a hair up to one-quarter inch in diameter, and which cross and intersect each other in all directions, and of a reddish brown lustrous color, are reproduced with surprising fidelity.

Plate 6 is a study in color that will charm the most critical. It represents a cut amethyst from Maine and a group of amethyst crystals from Pennsylvania. The gradations of color in this plate, and the prismatic effects and the play of light on the cut gems give them an approach to the brilliancy of the stones themselves, which is a revelation of the printer's skill.

Plate 5: This is a double-page illustration showing five gems. A large crystal of emerald found in North Carolina; an Amazon stone (Microline) from Colorado; a cut Aquamarine from Maine; Azurite and Malachite in concentric bands from Arizona, all evidence of rare skill and fidelity in color illustration.

In plate 4 attention will be arrested by illustrations showing different varieties of tourmaline and a section of a crystal of tourmaline from Maine, showing dark blue and pink centre with white exterior. A close approach to the original is found on plate 3 in a representation of chlorastrolite from Lake Superior and an almandite garnet crystal from Alaska.

Plate 2 shows the holy toad of the Zuni Indians, a clam shell incrusted with turquoise and shell. Also a specimen of cyanite from North Carolina and a bit of turquoise in rock from new Mexico, all three rare bits of coloring.

While the volume is artistically of great value its practical worth is immeasurable. The identification of specimens can readily be made from the plates, thus giving the miner and prospector the advantages that hitherto have been enjoyed by the expert, collector, mineralogist and geologist. It is a guide for the dealer and the jeweller. The volume should find its way into every school library, for here we have the history of gems and precious stones. The chapter on pearls is of intense interest. The most important pearl fishery on the American coast is that of lower California where the true pearl oysters are found. This and other fisheries on the west coast extending for 3,500 miles have been confirmed to the Pearl Shell Co., of San Francisco, by special franchise from the Mexican Government.

In 1857 a pearl of fine lustre, weighing 93 grains, was found at Notch Brook, near Peterson, N. J. It became known as the "Queen Pearl," and was sold by Tiffany & Co. to the empress Eugenie, of France, for 62,500; it is to-day worth four times that amount. In the same locality was found a large round pearl weighing 400 grains, which would doubtless have been the finest pearl of modern times if it had not been ruined by boiling open the shell. Within one year pearls were sent to the New York market from nearly every State. Kentucky, Tennessee and Texas are the principal pearl-producing States.

We have in this work an account of seventy-four different collections of precious stones, including those of the United States National Museum, New York State Museum, Metropolitan Museum of Art, those in different colleges and in the hands of private

collectors. The finest known collection of precious stones, and the finest collection of those found in the United States, is the one presented by Mr. J. Pierpont Morgan to the American Museum or Natural History, Central Park, New York. It contains over 1,000 specimens.

We recommend this magnificent volume to all our readers, particularly those who reside in New Mexico, Arizona, California, Oregon, Washington and the Southern States. Each important gem is described and a series of analyses given, indicating the composition of each precious stone. There are many illustrations other than the colored plates, the work of Messrs. L. Prang & Co., of Boston. Orders can be filled at the subscription price direct from this office.—*American Grocer.*

THE NEEDLE-AND-THREAD TREE.

Imagine the luxury of such a tree, and the delight of going out to your needle-and-thread orchard and picking a needle threaded and already for business. Odd as it may seem to us, there is, on the Mexican plains, just such a forest growth. The tree partakes of the nature of a gigantic asparagus, and has large, thick, fleshy leaves, reminding one of the cactus, the one popularly known as the "prickly pear." The "needles" of the needle-and-thread tree are set along the edges of these thick leaves. In order to get one equipped for sewing, it is only necessary to push the thorn or "needle" gently backward into its fleshy sheath, this to loosen it from the tough outside covering of the leaf and then pull it from the socket. A hundred fine fibres adhere to the thorn-like spider webs.

By twisting tho "needle" during the drawing operation this fibre can be draw out to an almost indefinite length. The action of the atmosphere toughens these minute threads amazingly, to such a degree as to make a thread twisted from it, not larger than common No. 40, capable of sustaining a weight of five pounds, about three times the tensile strength of common six-cord thread. The scientific name of this forest wonder is *Tensyana mucadina.*—*St. Louis Republic.*

AN ENTERPRISING GROCER at Petersburg, Virginia, has hit upon a somewhat novel plan for taking orders from his customers. He sends to different residences each morning tame carrier pigeons. Small order slips with a loop on the end of them are furnished the customers, and on one of these is written the order. The loop is thrown over the bird's neck and it sails back to its owner. After all the birds have returned the orders are at once filled by delivery wagons. The scheme works admirably.—*Farm Journal.*

AFRICAN FEVER AND THE BLUE GUM TREE.—Dr. J. Croumbie Brown, with his customary zeal, has compiled some particulars relating to the culture of the Eucalyptus in Italy, and its effects in ameliorating the climate. The results obtained are such as to warrant the culture on a large scale of the Eucalyptus in the malarious parts of tropical Africa. From experiments made and calculations based on them it is shown that the leaves of these plants evaporate double or treble their weight of water, and even a much larger quantity. The trappist monks who formerly could not sleep without risk of life in their monastery in the Pontine Marshes, but betook themselves every evening to a convent in Rome, can now remain at their monastery of Tre Fontanes, with little risk, and the peasantry who were formerly obliged to migrate to the mountains in summer now reside on the Campagna all the year round. This improvement has followed upon the extensive plantation by the monks of various species of Eucalyptus.—*Gardeners' Chronicle*, Sept. 6th.

TROPICAL PRODUCTS IN BRITISH NORTH BORNEO.—The information given by Mr. W. D. Gibbon in his letter elsewhere regarding the cost of and profit from a Liberian coffee estate in British North Borneo is interesting, but we fear of no practical value to Ceylon planters,—Liberian coffee being now little more than a name in our island. The pamphlet which accompanies the letter consists largely of extracts from letters and reports that have appeared in the *B. N. B. Herald*, and which we have extracted from time to time; to which are added land regulations and rainfall and other tables.

HOP TEA: A NEW INDUSTRY IN KENT.—There is at last some hope for the unfortunate hop growers who for so many years past have been carrying on their business with the figures on the wrong side of the ledger. Hitherto they have only had one outlet for their produce, but in future they will have a choice between the brewers' mash tun and the British housewife's teapot. A company has been floated for the manufacture of the hop tea, to be blended with some of the stronger qualities of the Assam and kindred sorts. In view of the approaching hop-picking season, the company have acquired the large riverside premises belonging to Mr. E. S. Tapply, near Maidstone Bridge, where the work of drying and preparing the hops for conversion into tea will be carried on. Already 700 casks of the mixture have been disposed of in the tea trade, and the "brew" is highly spoken of by those who have tried it. A Maidstone grocer has, it is stated, given an order for a ton of the hop tea, and it is expected that the commodity will command a ready sale on the market. The premises are, we are informed, being fitted with the necessary enginery by a local firm of engineers, and in the course of a few week it is hoped that the new industry will be in full operation, and thus add another important branch to the commerce of the county town.—*Sussex Express*, Aug. 26th.

OPIUM-DRINKING IN ENGLAND.—The use of opium is alluded to after a rather too trifling fashion in the story (fictitious of course) reproduced in our *Household Register* today. Our readers are aware how serious an evil the addiction to opium in the shape of laudanum drinking, has become in the Fen districts of England, and about Gravesend and other low-lying parts. We have shown how great a boon quinine ought to be in these cases: that is for example, if every clergyman and philanthropist in the Fen districts got the people suffering from ague, to try quinine in place of laudanum. The opium practice we refer to is of long standing and it may be worth reproducing the paragraph in which (in Charles Kingsley's "Alton Locke") "Varmer Porter" enlightens Alton, during their drive to Cambridge, on the meaning of "a penn'orth of elevation":—

Varmer Porter:—'Love ye then! they as dinnot tak' spirits down thor, take their pennord o' elevation, then—women-folk especial.'

'What's e levation?'

'Oh! ho! ho!—You goo into druggist's shop o' market-day, into Cambridge, and you'll see the little boxes, dozens and dozens, a'ready on the counter; and never a ven'man's wife goo by, but what calls in for her pennord o' elevation, to last her out the week. Oh! ho! ho! Well, it keeps women-folk quiet, it do and it's mortal good agin *ago* pains!

'But what is it?'

'Opium, bor alive, opium!'

'But doesn't it ruin their health? I should think it the very worst sort of drunkenness.'

'Ow, well, yow moy say that—mak'th 'em cruel thin hen, it do; but what can bodies do i' th' *ago*? Bot it's a bad thing, it is.'

CEYLON TAMIL COOLY MISSION.

Many who have supported this Mission seem to be growing weary of doing so, and many more wholly decline to help at all, giving as a reason that we are doing no good. I am far from endorsing this statement; but I am as far from satisfaction concerning results as any real friend of the Mission who desires to see souls converted to Christ and His Kingdom extended. I realise more and more that the best efforts of man will accomplish nothing apart from the immediate presence of the Lord Jesus and the power of the Holy Spirit. But I think with many others that the time has come for making some new plans to bring the Gospel message to the coolies. For this purpose I am about to start an associated band of Evangelists, whose aim will be to carry the good news to as many as can possibly be reached. They will visit estates, preaching and teaching in the lines, and holding meetings wherever they are invited or permitted to go. They will also conduct prayer and revival meetings amongst the Tamil Christians. The great object of these meetings will be to show to the nominal Christians as well as to the Heathen that Jesus is a Saviour who is able to save, and that when He saves, righteousness, truth, love and purity are the result. We believe that Jesus does this, and that He will do it. Therefore we confidently appeal for help. I have two or three men into whose hearts God has put a loving strong desire to preach a full Gospel to their fellow-countrymen and women. I need special funds for supporting them. I need also help to build a commodious house for the associated workers to come to for rest as a centre. This must be near to myself at Lochiel, so that I may meet them as often as possible. We have a good school at Wootton where they may work whilst resting. I purpose building their house on to the School room which also needs rebuilding. A few musical instruments are a great help in itinerating preaching—these must be bought. I am not without hope that God will give me one or two young Englishmen whose hearts He has kindled with love to the Saviour, who will lead and work with these Native brethren under my general direction. I myself am too old to be the leader in the field, but as far as duties and strength allow, I hope not only to say to them go, but also to say come. God is enabling me to believe that He will do greater things than we have seen of late years. We will put no confidence in an arm of flesh, our trust is in the Lord; He is the God of Salvation. We believe we shall yet join in singing the 98th Psalm. Any help for this new effort, independent of that given to the General Funds of the Mission, will be thankfully received.

J. D. SIMMONS.

Lochiel, 15th September 1890.

DANGER IN WATER FILTERS.—The old charcoal and gravel filters, which once had the entire confidence of families and physicians as entirely efficacious in purifying drinking water, have been recently found to be not only of dubious character, but even in cases to aggravate the danger which they were expected to allay. The investigation of the Rhode Island Medical Society seems to show conclusively that the meshes and interstices of the filtering matter become clogged with the deleterious organisms of the water, and that these increase in number when the filter is not in use, standing in the warm air of the kitchen. In one examination by this Society unfiltered water containing thirty-six colonies of organic growth increased to 10,000 after filtration. The danger of the filter seems to lie in the impossibility of cleansing it. A simple way of purifying the water is to boil it freely for ten minutes. Then pour it into a broad earthen dish, in the open air, where it can cool away from any chance of contamination. The water thus prepared may be kept in a stone jar in a cool cellar for four or five hours at a time, and when cooled with pure ice is a good substitute for spring water where spring water cannot be obtained, and it is probably as harmless as this gift of bounteous nature can be rendered in the restrictive environments of a large city.—*New York Tribune.*

CINNAMON AND COCONUTS.—Kadirana, Oct. 3rd.—There is a change in the weather, and light showers have fallen during the last few days, yesterday's fall being 0·53 of an inch; till more comes this will at least cause the grass to grow and give food to the half-starved cattle.

TEAMEN will be interested in the following telegram:—"Chicago, 29th July.—Ernest Theodore, a prominent tea exporter from Hankow, China, is in this city. In speaking of the tea commerce Theodore said: 'The recent passage of the Silver Bill raised the price of tea 10 per cent. We make all our payments in silver out there, little gold being used. The purchase of 4,500,000 ounces of silver a month by our Government is equivalent to taking out of the market just so much that was hitherto available. The eastern markets have felt this influence, and silver in London has risen in price. The tea crop in China is heavy this year and of prime quality.'"—*N.-C. Herald*, Sept. 5th.

CULTIVATION OF TOMATOES IN ENGLAND.—At a conference of the British Fruit Growers' Association, held at Brighton yesterday, it was stated by one of the members that from the two stations of Worthing and Lancing, during the three summer months, 35 tons of fruit were despatched by rail weekly, and for the remainder of the year six tons per week, making 663 tons of fruit during the year. Of this amount, 350 tons were tomatoes, the remainder being grapes, cucumbers, apples, &c. The value of the tomatoes at 5d. per pound was estimated at £20,000, and the other fruit at £14,000, making a grand total of £34,000 from the Worthing district alone. Other speakers maintained that the industry was not fully developed, and that for a long time to come the supply of English tomatoes would not exceed the demand.—*Globe.*

DARJEELING.—Tea is, of course, going on in the even tenor of its way, and it appears as if, although the nights are getting markedly colder plucking would be kept on until about the middle of November—on a small scale of course. Taking into consideration the long drought at the beginning of the year tea gardens in the hills do not seem to have done so badly after all in the hills, and the rise in prices has been decidedly encouraging to planters generally. What effect the improved exchange will have on Calcutta prices of course remains to be seen. I have always been given to understand that a low rate of exchange always meant good prices for Indian productions of all kinds Here is another problem which will need solving later on. What effect will the gold finds in the centre of India have on tea prices in the future? This is a question which I leave others to solve, as it is quite beyond me.—*Indian Planters' Gazette*, Sept. 16th.

WHOLESALE DESTRUCTION OF FISH.—Colonel Campbell Walker, Conservator of Forests, Southern Circle, Madras, recently brought to the notice of his Government the wholesale destruction of fish in rivers. In the Bhavani river the main and subsidiary streams are dammed up and the fish destroyed by dynamite, or the water baled out and fish, both large and small, taken and sent into Mettupalayam in bullock and cart loads; and as a similar practice is followed in almost all rivers, it would ultimately tend to the extermination of fish in the rivers of southern India, as by the above system both fish and fry are destroyed. It is under contemplation to alter the rule in the Madras Forest Act which permits "the catching of fish by the damming or baling of water" by a proviso that "the Collector may attach such conditions to the issue of the permit as he may consider necessary." This would only affect fishes in rivers running through reserved forests, and it is incumbent on Government to adopt some legal measures to regulate the wanton destruction of fish and fry, such as their capture only by the net and rod, the meshes of the former being regulated to such a size that fry may not be taken.—*Pioneer*, Sept. 18th.

CINNAMON, CINCHONA BARK AND CITRONELLA OIL AT THE LONDON DRUG STORES.

In the *Chemist and Druggist* of 26th July is an interesting paper entitled "Through the Drug Show-rooms," in which a description is given of the new drug show-room at the Crutched Friars warehouses, where the sales are now held. We extract the following portions, which relate to Ceylon productions :—

CINNAMON AND SPICES.

At the London and St. Katharine Docks huge supplies of drugs and gums are stored amid still larger quantities of wool, coffee, wheat, wine, and other commodities. The first warehouse which appeals particularly to druggists is "No. 6," situated immediately to the right of one of the principal entrances. Two floors of this huge building are devoted to the storage of spices—one contains cinnamon, and at the top floor immense quantities of cinchona bark may be seen. There are very rarely any "shows" of drugs or spices at these warehouses. They are situated too far to the east of Aldgate Pump—that Ultima Thule of London City—to be easily accessible to the busy City man, and when, some time before the closing of Fenchurch Street warehouse, it was suggested in an unofficial sort of way that the drugs might in future be shown at the Docks, the opposition threatened to this project on the part of the druggists was strong enough to cause the Dock Company to relinquish the idea—if they had ever entertained it seriously—pretty promptly. The cinnamon floor of "No. 6" warehouse is a much less interesting place now than it was before the cinnamon trade entered upon its present period of decline. Cinnamon is imported from Ceylon in canvas-covered bales about four feet in height, and packed with considerable care. Exceedingly thin quills of the spice are placed one within the other until they form a long and compact, though brittle reed or stick. A large number of these sticks are packed together in a roll, or bale, and upon their arrival in the warehouse they are sorted, re-packed, and classified in four different grades, according to thickness, the thinnest bark being the best. Besides these four varieties of whole sticks, the broken sticks are sold separately—mostly to druggists. Cinnamon "chips"—which, are, or were, exported separately from Ceylon in large quantities—are the small shoots removed from the long quill bark when it has been stripped of its leaves. They are very largely used for the distillation of essential oil, but the recent combination of cinnamon-growers in Ceylon has placed a veto upon their export, on the ground that their extensive sale spoils the European market for the more valuable product. In the spice floors Zanzibar cloves take up an immense amount of room, the stock of that article being at present very large. The Zanzibar cloves are imported in fibre-plaited mats or bales known sometimes as "gonjes," of about 140 lb. weight. They are much darker and smaller than the cloves imported from Penang and Amboyna, but so far as commercial importance goes, the latter are now-a-days very insignificant. Nutmegs, mace, cassia, and cassia buds are also stored in considerable quantities in this warehouse, and on certain days the air is heavy with the odour of the spices which are being repacked, sorted, and sifted to render them suitable for the European market.

CINCHONA.

The bark floor is now mainly occupied by Ceylon and East Indian barks, which are usually packed in oblong canvas bales, weighing from 200 lb. to 300 lb. into which the small chips or shavings—in which the bark is now almost always sent over—are tightly packed by hydraulic pressure. The bales usually bear on the outside the name of the plantation and some mark indicating the species of the bark and the character of the contents, whether in shavings or chips, original or renewed. The barks intended for "pharmaceutical use," as distinguished from those more particularly adapted for use by the quinine manufacturers, are sent over in cases of varying weights, that mode of packing being resorted to the better to shield the quills against breakage, and to prevent the moss with which they are frequently overgrown, and which adds to the value in the eyes of many purchasers, from being crushed or torn off. The South American "seron" of bark is not so often seen now as formerly, but it is the most characteristic form of package. The hide serons are usually light—from 1 to 1½ cwt. being the general range—and consist of undressed cowhide. The serons are usually provided with handles made of small strips of hide, by which the packages are slung across the backs of the mules, which are the chief if not the only, means of transport across the rough paths of the Andes. Some of the South American quill barks frequently flavoured strongly of the smoke of the fire over which in their rude way the "cascarilleros" were wont to dry them. Other quills again possessed as earthy flavour which they acquired from the soil upon which they were roughly thrown to be dried by the heat of the sun. The original flattred bark from the South American forests, the "Cortex China Regia," is now very seldom met with in commerce. It was mostly bought by French firms, and is generally thought to have been employed principally as an ingredient in a remedy against drunkenness, and in tooth-powders. There is still in the warehouses a large supply of the Cuprea, Pitayo, and soft Columbia barks, which were imported in huge quantities some ten or twelve years ago, and in making his way out of the building the visitor passes through alleys between immense piles of packages of cinchona of all varieties.

ESSENTIAL OILS.

East Indian sandal-wood oil arrives here in huge copper pots, protected by a strong netting of rope-work. A pot usually contains about twenty gallons of very turbid oil. The oil is therefore emptied from the pot into large copper "jacks," or vats, about 5 feet high and quite 3 feet in diameter, and left to settle. The "jack" is provided with two taps—one, about 12 inches from the bottom, being used to draw off the clarified oil, while the lower tap allows the thick dregs to run out. The latter are sold separately. Indian rose-oil is treated in the same manner, and so, in fact, are many other essential oils stored at this warehouse. Rose-oil is imported in metal drums provided with a handle and a bunghole at the top. These tins—usually old kerosine tins—are used for packing quite a large number of Eastern drugs which come into this market. In close proximity to the oils is found East Indian nutmeg-paste, in tins weighing about ½ cwt. each, four or six of which make up an original case. Cinnamon sawdust is often used for stuffing between the bottles or other breakable packages in ide cases of essential oils. Citronella and lemongrass oils were formerly imported almost exclusively in bottles of about 21 oz. each, 24 or 36 in a case. Under this mode of packing they were liable to considerable damage, and recently an innovation has been introduced by the importation of these important articles in 5-lb. tins. Quite lately the oils have been shipped in so-called "tanks"—heavy iron casks protected and kept from rolling about by a strong wooden crate. The tanks have evidently been sent to Ceylon as containers for a different liquid, and are returned to us filled with oils.

COFFEE GALORE!

Who says coffee is dead in Ceylon? Up and down in Uva this year, there is an experience of blossom and a promise of crop sufficient to prove the contrary. The way in which native coffee is bearing and blossoming in the Principality astonished Dr. Trimen we learn, and we ourselves saw most satisfactory evidence of good crops to come all along our route, more especially in Haputale where we were just too late to see a whole countryside white with blossom. But there is also crop on the trees nearly ready for picking, and we have brought back from New Galway, a couple of primaries as a specimen of crop on Mr. Kellow's fine little Albion property, which ought to be a cure for the "sore eyes" of the V. A., whose sight got

damaged trying to see and estimate any coffee berries for his employers! On one of these branches no less than 954 coffee berries have today been counted. Mr. Kellow and some of his neighbours are believers in the old Uva system of cultivation *without pruning*, and certainly the result in the case of Albion seems satisfactory. Of course there is liberal cultivation otherwise; and indeed if coffee planters anywhere in Ceylon expect crops in these days, there must be a liberal reliance on manure as well as on Providence.

UVA AND HAKGALA GARDENS, &c.

The Director of Botanic Gardens (Dr. Trimen) accompanied by Mr. Nock of Hakgala, has been on a visit of inspection to the Badulla Garden, which we can testify to be a very pleasing addition to the amenities of the capital of Uva, and in itself—considering the soil and situation—a wonderful success reflecting credit on the Department. Dr. Trimen returned via Haputale and Horton Plains where the successful growth of plants put out there was noted—and others are to be sent. Some new or rare plants were collected by Dr. Trimen and Mr. Nock during the Horton Plains expedition; and the former has been much pleased with the progress made in the various experiments at Hakgala Gardens, where the new vegetables, fruit bushes and trees are giving satisfaction. Apples and pears have been produced with a flavour far superior to that of any yet grown in Ceylon. All the fruit trees are for the present, "resting." As for potatoes, we have some specimens of the "fourth generation" from the seed brought by Mr. Nock from England, and they weigh up to over 1 lb· each, and are perfectly healthy. To other features of the Gardens we must refer later on. Dr. Trimen returned to Peradeniya on the 19 h instant. It would be well if every province, and indeed revenue district, had its Experimental Garden, subject to the oversight and inspection of the Director and his Assistants.

THE LATE EXPERIMENTS WITH MANA GRASS FAILURES.

During the week it has been possible for me to read over the reports made by Messrs. Ibotson and Dr. Evans relative to the late trials made of mana grass, respecting the progress of which you have been kept fully informed by me. That by Messrs. Ibotson is certainly very discouraging, all the attempts made by them having been failures. There are, however, very curious facts relative to the trials made which lead us to the conclusion that very probably a mistake has been made somewhere or other which would sufficiently account for the disappointing results as yet reported. Dr. Evans, after personally witnessing the later trials made by Messrs. Ibotson, took away with him some of the grass which had formed the basis of those trials. This he tested in his own laboratory, and found that the product of his endeavours differed wholly and entirely in its character from that he obtained when testing the first lot of mana grass. You will recollect that the sample sent you by me of the result to that first testing—and as to which Dr. Evans reported most enthusiastically—was an eminently strong and fibrous paper. The outcome of the trial made by that gentleman with the second lot of grass received was identical in character with what was obtained by Messrs. Ibotson, namely a dusty weak pa er which would scarcely bear handling in pieces of only a few inches square. Indeed the specimens produced of this broke with their own weight and were absolutely worthless. Now the question consequently arises, What can account for the vast difference between the results to the two trials?

Dr. Evans inclines evidently to the view that the two lots of the grass obtained, differed altogether in character. Whether this difference be due to the different localities in which the grass was grown, or whether it may be owing to the different conditions of age or ripeness at which it was plucked, the expert professes himself unable to say; but he suggests both explanations of the very striking contrast between the results obtained. To my own mind it occurs as possible that the second lot of grass received was not mana grass at all, but citronella grass. To a great extent, this possibility is based upon a fact mentioned by Dr. Evans in his report that, during the boiling operation, the grass gave out a very powerful odour of citronella. Whether that oil may be to some extent contained in mana grass is not known to any of us. At all events, that the reputed mana should give out such a scent is a circumstance worthy of every consideration in estimating the gravity of the conclusions to which we have been forced by the ill-success which has attended the working of the shipment of grass specially sent home for these trials. The first lot of the grass dealt with was but a small parcel, and was obtained from Mr. J. L. Shand. The second—in quantity some fourteen hundredweights—was obtained by Mr. Kelly in Dikoya, but I am as yet uninformed whence Mr. Shand obtained his supply. Anyway, there is a radical difference between the two lots of the raw material which have hitherto been tested. Of the first Dr. Evans spoke in terms even more highly commendatory than he permitted himself to use in his written report, and no one is more astonished and disappointed than himself at the result to the larger scale trials lately undertaken. As yet there has not been sufficient time for the Stanley-Wrightson Syndicate to determine what the next steps to be undertaken by it shall be. Probably the endeavour will be made to obtain the judgment of expert botanists upon the character of the two lots of grass. That such great diversity should be found as the resul of the treatment of these is most perplexing, and certainly lends colour to the idea that they must have been radically different in character. If the examination by competent botanical knowledge should decide that such difference is marked, it will be vital to future success that a larger quantity of grass, plucked at different stages of growth and from different soils, should be obtained from Ceylon. I hope when writing next to have learned more conclusively what has been done, or is in contemplation, with respect to this matter.—*London Cor.*

NOTES ON PRODUCE AND FINANCE.

ARE THE CHINESE LIKELY TO ADOPT NEWER METHODS IN TEA CULTIVATION.—As the Chinese will have to take rigorous action of some kind if they are to retain a tea trade of any importance, the question arises, will they cultivate with more care and adopt newer methods of manipulation in manufacture? The British Consul at Canton hints at this in a recent report when he says: "From observation of the tea plantations in the immediate neighbourhood, the quality of the teas might be considerably improved if a little more care was devoted to the cultivation of the bushes, and if foreign appliances for drying the leaf immediately it is plucked were introduced, for the plantations seem utterly neglected, and much leaf is ruined while on its way to Canton to be fired when it chances to be rainy weather." But he also says, and this adds to the hopelessness of the outlook for the Chinese,

"The weight of taxation to which they are exposed, and which there seems little possibility of hope of reduction, renders it impossible for them to compete with Indian and Ceylon teas in their chief recommendation—cheapness."

Cotton Cultivation in Central Asia.—In order to develop the cultivation of cotton in Central Asia, the Russian Minister of Finance has ratified the project of leasing 60,000 deciatines of land (about 162,000 acres) in Turkestan to the Commercial and Industrial Company of Central Asia in order that it may form plantations of cotton there. The *Journal de la Chambre de Commerce de Constantinople* states that the lease is for ninety years. The company has the privilege of growing, besides cotton, all other plants; it is exempt from any rent during the first fifteen years of working. After that period it will have to pay a rent which will be equal to the land tax collected on Turkestan territory.

A New Coffee Size.—The Americans are using a mixture for sizing coffee which may be effective but it is not nice. According to the *Grocer*, its active ingredients consist of common or condensed milk, ground or powdered glue, glycerine, refined lard, and in some cases, bicarbonate of soda, fine table salt and vinegar. The latter only affects the gloss or polish of the roasted coffee in keeping down too high a polish. The action of the bicarbonate of soda is said to keep all these heterogeneous ingredients "sweet." In preparing the coffee for the "size" it is first roasted dry, and allowed to cool somewhat; the mixture is then added in such proportion and in such a manner that each berry gets a thin coating of varnish. It is claimed that by this process the berry is hermetically sealed and the pores completely closed up, thus preventing the aroma from escaping, and so preserving the full strength of the coffee. No moisture can penetrate through the varnish. Further, when the coffee is being made in the pot the "size," it is claimed, acts in such a way that the "grounds" are caused to settle rapidly, so nothing is needed to be added to the liquor to "clear" it. The natural flavour is not modified, and it is stated that the caffeine or active principle of the coffee is reserved to the fullest extent.

The Tea Duty in America.—We learn by cable from New York that the majority of leading American tea dealers have forwarded to Washington a protest against the section in the McKinley Tariff Bill which provides for a ten per cent. *ad valorem* duty on teas, the produce or growth of countries east of the Cape of Good Hope, when imported to America from places west of the Cape of Good Hope. The protest declares that the section is avowedly intended to retaliate against Canada, but is in reality aimed at the London markets, on which the United States depend for Indian and Ceylon teas, England being the only convenient halting place between the East and the States. It is further stated that the section is really the scheme of a few big dealers to monopolise the United States market.

The Produce Clearing House and Indian Tea.—As mentioned by our Special Commissioner last week, it was resolved, at a recent meeting of the Produce Clearing House Tea Committee to definitely commence business in Indian teas on January 1st, 1891, and, as soon as the experts have been appointed, the types of quality will be chosen and circulated amongst the trade.

Alcohol and Tea.—The following interesting paragraph is going the rounds of the papers. It is not a new form of conundrum, although it reads very much like it:—"A series of physiological experiments is being made by Dr. Kraeplin as to the respective effects upon the mental powers ("psychical reaction") of alcohol and tea. By this finding alcohol diminishes ideas and strengthens the verbal association of words and the association of auditory impressions. But as to tea, he finds that it favours the association of ideas and intellectual work, while embarrassing the association of words."

Planting in Java.—The financial statement for Java will shortly be submitted to the Dutch Chamber. It is expected to show a large deficit, the amount being named as twenty millions of guilders. Last year the crops in Java were very poor. Most of them suffered from blight, and the yield was much below an average amount. Many planters came out well owing to the comparatively high prices of sugar and coffee. Others suffered severely, however, and the rice crop was not more than "middling." The native population in Java is undoubted very poor, and it is burdened with heavy taxation. This is the real trouble in Java, and nothing but very good crops can make the people at all prosperous.—*H. and C. Mail.*

SIR CHARLES BRUCE ON INDIAN LABOUR EMIGRATION.

Sir Charles Bruce (in the *New Review*) gives an able and interesting history of the emigration of labour from India, specially to the West Indian colonies and Demerara, since the period when the abolition of slavery rendered necessary supplies of men able and willing to work *regularly*. Sir Bartle Frere is quoted as stating in 1873 that

"The Bengal labourer with wages at 1½d or 2d a day, and no roads or canals to bring him food, is always terribly near the brink of starvation"; and again, "Though I believe the existing population of India is, as a mass, better fed than it was forty years ago, still there are large masses, especially in Bengal, living on the limits of starvation."

The testimony of Mr. Grierson, an officer deputed by the Government of India to inquire into the system prior to the passing of the Indian Emigration Act of 1883, is as follows:—

"The Colonies importing Indian labour are in the belt of the Tropics. The only exception is Natal, which is sub-tropical. The conditions of life in these Colonies are much the same, viz., an equable climate, free from sudden or extreme variations, and an amazing fertility. The original natives of these countries, living for generations where life without labour was easy and pleasant, have developed into a type of human beings peculiarly unfitted for the higher forms of cultivation of the soil. When, therefore, European enterprise attacked these countries with the hope of carrying off the richer products of the earth, the indigenous natives were found unsuited for aiding them in the work. Coolie labour had accordingly to be introduced; and the only places where suitable labour was found to be available were India and China. Both these countries are subtropical, the greater portion being outside the tropical belt. Here the conditions of life are very different. The climate is anything but equable, and is subject to sudden and extreme variations. At one time the country is deluged by rain, at another parched for months together. Here life is impossible without labour. The most elaborate precautions have to be taken to obtain even a probable chance of raising a moderate crop; and the result is that the inhabitants of India and China have, in the course of generations, developed into human beings possessing considerable agricultural skill and a wonderful capacity for continuous hard work. The Indian's whole life is one long labour—he never has a moment's rest. . . . When an Indian coolie is transported to a tropical Colony, he finds himself in a place quite beyond his experience. He finds a soil capable of yielding good crops with hardly any cultivation, and he naturally applies to it all the labour and all the skill and industry inherent in him. The result is an out-turn such as would be impossible in India, and such as he had never even dreamed of before. Subsequent experience confirms his first impressions, and he rightly considers that he has found a place free from cholera and famine of a warm equable climate, where his natural industry, if rightly applied, make its possessor in a few years the owner of a large fortune."

This is the sensible view of the case; and what remained for the Indian Government to do was to secure the well-being of their subjects *en route* to and while employed in the scenes

where they sold their labour for wages, but did not sell themselves into slavery, as some of the former slaveholders, especially those in the French Colonies, were too apt to think they had done. Sir Charles Bruce states :—

It was only after long experience and many years of tentative experiments in the passing of regulations that the Home and Indian Governments were satisfied that the introduction of Indian labourers into our Colonies conduces as much to the welfare of the emigrants as to the general prosperity and commercial wealth of the Colonies.

Many of our readers will recollect the Commission of Inquiry which was sent to the very Colony from which Sir Charles Bruce now writes, of the results of which Mr. Jenkins, the author of "Ginx's Baby," gave so fair an account. Emigration to British Colonies was not only continued but encouraged, while the persistent cruelty and injustice of the planters in French Colonies deprived them of the benefits of this form of labour. After showing that the conditions of emigration to the Straits and Ceylon are essentially different to those applying to the more distant Colonies, the writer proceeds to give a summary of the conditions which apply to the latter. We quote a passage which shows that the cooly who earns wealth in one of those *eldorados* is not permitted its free enjoyment in his own country :—

The wealth of the returned emigrant often excites the cupidity of his neighbours, and unless he can soon find a good investment, the attempts to get money from him under various pretexts, such as caste dinners, &c., and even by theft, become burdensome, and so many re-emigrate, after a few months, fairly disillusioned with Hindustan.

The conditions under which Indian emigrants are generally employed are thus summarized :—

Generally the period of indenture is five years. In some Colonies coolies are allowed to reindenture, in others their industrial residence, as it is termed, terminates at the end of the original period of indenture. Everywhere the coolie is entitled to a free dwelling and garden ground, and it is the constant care of the Government that all needful requirements of accommodation, ventilation, and sanitation shall be observed in the construction and maintenance of his dwelling at the cost of the employer. The rate of wages varies according to the nature of the work, which includes the cultivation of the soil and the manufactures of the mill. The minimum daily wage for able-bodied adult males is generally about one shilling. There are many kinds of work at which larger wages can be easily earned when the immigrant has had practice and experience. In some Colonies wages are partly paid in rations, and in all arrangements are made for the rationing of coolies in certain circumstances. The hours of work vary generally from five to ten hours, according as the work is in the field or in the factory buildings. Where task work is set, an able-bodied adult can earn the minimum wage well under eight hours. The indentured coolie is always entitled to medical care and maintenance during sickness. The hospitals provided in the Colonies for the accommodation of the coolies place them in times of sickness in a position of singular advantage as compared with agricultural or urban labourers in Europe. Return passages, when claimable, are given generally after a continuous residence of ten years, five years having been passed under indenture. Such passages are claimable in the case of all the more distant Colonies, but a comparatively small proportion are claimed. As the Indian population in a Colony grows, as children are born and families become bound to the Colony by new ties, each succeeding generation becomes more and more firmly rooted in the soil. Of those who do return to India, a large number bring back their friends and relations to the land of their adoption

Sir Charles Bruce proceeds :—

The Imperial interests concerned in the system were broadly stated by Lord Salisbury in a despatch to the Government of India of the 24th of March, 1875, in which he said: "Having regard to the greatness of our Indian population, and to the probability that under the protection which the British Government affords from depopulation by war, and, as far as possible from famine and other evils, that population must continue very greatly to increase—especially in the healthier and more densely populated parts of the country, where the numbers already press on the means of subsistence, and the lowest classes are at all times little removed from want—it appears to me that, from an Indian point of view, it is desirable to afford an outlet from these redundant regions into the tropical and sub-tropical dominions of her Majesty, where people who hardly earn a decent subsistence in their own country may obtain more lucrative employment and better homes. While, therefore, from an Indian point of view, emigration properly regulated and accompanied by sufficient assurance of profitable employment and fair treatment seems a thing to be encouraged on grounds of humanity, with a view to promote the well-being of the poorer classes, we may also consider from an Imperial point of view the great advantage which must result from peopling the warmer British possessions, which are rich in natural resources and only want population, by an intelligent and industrious race to whom the climate of these countries is well suited, and to whom the culture of the staples suited to the soil and the modes of settlement and labour are adapted. In this view also it seems proper to encourage emigration from India to Colonies well fitted for an Indian population. Under extraordinary circumstances—such as famine, flood, or other great calamities, when large numbers of the poorer classes are deprived of the means of subsistence, or are left without house and home—the Government officers might themselves engage emigrants for those Colonies which have agreed to receive people recruited under such circumstances."

Lord Salisbury deserves all credit for his large and statesmanlike views of what is best for the Indian Empire, for the British Colonies and for the Indian labouring classes, who are in their own country multiplying beyond the means of existence. As Mr. Grierson wrote :—

"Surely emigration may be looked upon as an engine of immense power for good to India. The more safety valves there are for a pent-up population in time of famine the greater chance there will be of saving life; and, if I may venture to offer an opinion on such a point, I maintain strongly that it is Government's imperative duty to actively encourage emigration by every legitimate means in its power, and to let it be known far and wide that the Emigration Department is a Government one."

Sir Charles Bruce adds :—

It may be said that up to the time of the passing of the Emigration Act of 1883 the Government of India tolerated the system as a favour to the Colonies, while from that date it has actively encouraged it as a power for good to India.

And now comes the portion of Sir Charles Bruce's paper which will be read with most local interest, from the frank testimony he bears to the courage and enterprise of the Ceylon planters. We are also grateful for the terms in which he recognizes our own efforts to help forward the enterprise on which the prosperity and progress of the Colony depend and which has rendered it famous wherever "the cups that cheer but not inebriate" are prized.

As a homely but none the less important illustration of the Imperial interests concerned in the successful conduct and expansion of emigration from India, may be pointed out its effect upon the cheapness and abundance of the commodities of the breakfast table. So far as the production of these commodities in British possessions is concerned, it may be said that the possibility of their remunerative cultivation depends upon immigrant labour. In the year 1878, when I became officially connected with the Island of Ceylon, the export of tea amounted to some 400 lb.; the export of the present

year is estimated at 40,000,000 lb. The growth of the tea industry in Ceylon has been justly described as one of the wonders of the modern world, and to the courage and enterprise of its planters, supported by the intelligent force of the Ceylon *Observer*, infinite credit is due for results which nevertheless could not have been accomplished but for the cheap and efficient labour of emigrants from India. In the far distant province of the Empire with which I am at present connected—in British Guiana—the fortunes of the sugar industry have been no less dependent on emigration from India. Without this resource no capital would have been attracted to the Colony, no estates would have been maintained, and no sugar made.

The Indian labourers return not only with wealth but with expanded ideas and independent self-respect. Sir Charles Bruce adds:—

In a recent return furnished by the Emigration Agent-General in Calcutta for British Guiana, it is shown that since the year 1854 the number of emigrants who have returned from that Colony to India has been 30,433 (inclusive of a large number of children) who have taken with them remittances to the amount of £457,243. They have also taken with them jewellery of the estimated value of £55,000 since the year 1875, prior to which no returns of jewellery were collected. The amount standing to the credit of the Indian emigrants in the savings banks of the Colony exceeds £100,000. This represents but a small proportion of their savings, for the coolie is an astute money-lender, and his ideas of a fair rate of interest are based on the principle that a bag of rice borrowed at seed-time should be repaid by two at the time of harvest. I regret that I am unable to give an estimate of the value of property held in the Colony by coolies, but in 1871 the value of their cattle alone was shown by the Report of the Commissioners to exceed £130,000. They are rapidly acquiring substantial territorial interests. In British Guiana, and I believe also in Trinidad, there are among them prominent owners of racehorses.

We have quoted very largely, but we must add the conclusion of this able and interesting paper, in which it will be seen that Sir Charles Bruce contemplates not only the beneficial continuance of Indian emigration to such Colonies as that in the administration of which he holds so high a position, but also its extension to the vast new empire which Britain has acquired in Africa:—

In dealing with the subject of Indian coolie emigration in its bearing on the interests of the Government and people of India, and on the development of the territorial and commercial resources of the Empire, it must not be thought that I overlook the question of the influence of emigration from India on the resident labouring population of the Colonies. With this question it is impossible for me to deal within the limits of the present paper. I desire, therefore, that what I have said may be understood as referring to the emigration of Indian coolies to British possessions in which the population is admittedly inadequate to the development of their resources. For instance, the area of British Guiana considerably exceeds 100,000 square miles, and, when its limits are determined, will probably be found to be about equal to the area of the British Isles. Of this area only about 150 square miles, the area of the Isle of Wight, is beneficially occupied. The population is under 300,000. In countries thus or similarly circumstanced, it would be a waste of time to argue that the development of their natural resources, which, without immigration, is impossible, is for the interest of all. The late Sir Philip Wodehouse, when Governor of British Guiana, said that "Since he had come to the Colony he had endeavoured to continue immigration on such a footing as would do more good to all. His reason for so doing was simply because he believed that there was not a single class of the population of the Colony that was not vitally concerned in the continuance of immigration. It might be that every class did not derive equal benefit from the introduction of immigrants into the Colony, but it was clear that all derived benefit. He believed that the estates could not be maintained if immigration ceased. The mercantile community, if the estates were abandoned, would find a cessation of trade; the public funds of the Colony would be distressed, and public officers would lose their salaries and their occupation in life; the mass of the population of the Colony would also suffer, inasmuch as the necessary consequence would be the loss of all those social, political, and civil institutions which, in point of fact, constitute civilisation."

Apart from all consideration of the direct advantages which coolie immigration has brought to British Guiana, an ethnic and historic interest attaches to the transfer of the population of Asia to the continent of South America. The adjustment of the balance of area and population is a question worthy of the statesmen of the greatest Colonial Empire the world has ever seen; and now that the Government has accepted the policy of an active encouragement of emigration, and that experience has indicated the principles on which emigration can be conducted consistently with an equal regard for the interests of capital and labour, it may be conceded that the time has come for the Government of India, together with the promoters of the great commercial enterprises recently undertaken, to consider whether a field for the organisation of Asiatic emigration on a scale of magnitude is not open in the sphere of British influence in tropical Africa.

OUR STAPLE EXPORTS AND THE CLOSE OF THE COMMERCIAL SEASON.

Although the Chamber of Commerce no longer lay themselves out for making up the export returns for our staples to 30th September—their season having been altered to suit the calendar year;—yet it is of interest to see how the actual shipments in the twelve months expiring today and the estimates framed a year ago compare. We cannot pretend to give exact results; for the latest Chamber of Commerce return is only made up to the 25th and the last statement for 1889 very probably overlaps a little with the fresh one begun from 1st January. But supposing that these two elements of error about balance each other we should get figures somewhat like the following for the total exports in Season 1889 90:—

From 1st Oct. 1889 to say 30th Sept.

Tea	...	...	43,067,101 lb.
Coffee	...	...	90,263 cwt.
Cinchona Bark		...	8,694,452 lb.
Cocoa	...	...	16,842 cwt.
Cardamoms	...	...	320,994 lb.

If this result prove to be fairly correct as regards tea, Messrs. Rutherford and Scovell will deserve credit for coming so near the mark as 43 million lb. a year ago. But there may be one qualification to that remark in the fact that but for the temporary stoppage of immigration and the derangement of labour in mid-season, the tea exports would probably have been larger. But there is always some unforeseen contingency to take into account, and we think the tea result may be fairly compared with the following estimates:—

Tea Exports for Season 1889 90:			Estimates:
Mr. Rutherford and Mr. Scovell		...	43,000,000 lb.
Messrs. Somerville & Co.	...	...	42 650,000 lb.
Ceylon Observer ...	...	...	42,000,000 lb.
Messrs. Forbes & Walker	...	...	40,000,000 lb.

Then in respect of the minor staples, we are gratified to see how nearly our own estimates published on October 9th, 1889, have worked out. Here are the comparisons:—

		"Observer" Estimate.	Actual Shipment as above
Coffee ...	...	90 000 cwt.	90,263 cwt.
Cocoa ...	...	16,000 cwt.	16,842 cwt.
Cardamoms ...		300,000 lb.	320,994 lb.
Cinchona Bark...		7,500,000 lb.	8,694,452 lb.

A difference of 1,194,000 lb in bark may be considered very large; but we have the satisfaction of believing that our estimate was nearest the mark—in fact the highest framed so far we know—our contemporary of the "Times" for instance keeping to 6½ million lb., while he was also below us in coffee and cocoa.

As regards the leading native export staples we may mention the following— :

	"Observer" Estimate.	Actual Shipments about.
Coconut Oil ...	350,000 cwt.	307,349 cwt.
Plumbago ...	350,000 „	405,429 „
Cinnamon (Quills & Chips)	2,000,000 lb.	2,266,837 lb

We do not pretend that the figures for shipments are quite correct; but they are near as can be worked out from the Chamber's returns at present and must be fair approximations.

Above, we give an approximate reckoning of the total amount of our Staple Experts to the end of the season—which is now abandoned in favour of the calendar year,—as compared with the estimates put forth a year ago. The result is singularly close in the case of tea to the estimates framed by Messrs. H. K. Rutherford and A. E. Scovell, quite independently the one of the other. Our own estimates were not far behind, while in the case of coffee, cocoa, &c., they were as near as could be desired.

In regard to the season we are now entering on, although we reserve our more careful investigation and estimates for the calendar year, yet it may be of some interest to indicate roughly, to what extent we anticipate shipments between Oct. 1st, 1890, and 30th Sept. 1891. Here then are the figures for,—

"*Ceylon Observer*" *Estimates*:

TEA	51,000,000 lb.
COFFEE	80,000 cwt.
COCOA	17,500 „
CARDAMOMS	320,000 lb.
CINCHONA BARK ...	6,500,000 „
CINNAMON ...	2,200,000 „
COCONUT OIL ...	320,000 cwt.
PLUMBAGO ...	400,000 „

The way in which Tea exports have increased may be seen from the following return going back only 5 years:—

Season 1885 6 ...	7,170,329 lb.
„ 1886-7 ...	12,013,686 „
„ 1887-8 ...	20,755,779 „
„ 1888-9 ...	32 516 682 „
„ 1889 90 (about)	43 067,101 „
„ 1890-91 (Est.)	51,000,000 „

It will be observed that we have diminished the estimated annual increase this time, but this is in correspondence with a falling-off in the extent planted after 1886.

In regard to Coffee the figures run very sadly the other way:—

1885-6 ...	223 693 cwt.
1886-7 ...	180 429 „
1887 8 ...	136,295 „
1888-9 ...	86,440 „
1889 90 (about)...	90,?63 „
1890-91 (Est.) ...	80,000 „

Last year our estimate proved exactly correct. This season Haputale and some other parts of Uva are to have good crops, but we fear this will be counterbalanced by a falling-off on this side of Nuwara Eliya, and we doubt if our declining staple will even reach 80,000 cwt.

For Cocoa, the return is:—

	cwt.
1885-6	13,347
1886-7	16,638
1887 8	12,611
1888-9	14,461
1889-90 (about) ...	16,842
1890-91 (Est) ...	17,500

The cocoa crop is a very difficult one to estimate although our last year's prognostication was exactly fulfilled, and we trust the moderate increase we specify will be realized.

Of Cardamoms, the shipments have been:

1885 6 ...	236,056 lb.
1886-7 ...	321,560 „
1887-8 ...	310,685 „
1888-9 ...	301,706 „
1889 90 (about) ...	320 994 „
1890-91 (Est.) ...	320,000 „

Then as regards Cinchona Bark, although our estimate a year ago for season 1889-90, was the highest published, yet we were found fault with in several quarters for venturing so high; but the actual shipments give nearly 1,200,000 lb. in excess of our estimate! Our reckoning for the current season is based on the annual fall already experienced, more than on a vain attempt to judge of what bark is available for shipment, such depending almost entirely on the prices that may be offered. Here are the figures for shipments and estimate:—

	lb.
1885-6	15,364,912
1886 7	14,389,184
1887-8	11 704,932
1888-9	10,498,487
1889-90 (about) ...	8,694,452
1890-91 (Est.) ...	6,500,000

The low prices prevailing give no encouragement to cultivate cinchona, and unfortunately as Ceylon decreases her exports, those from Java are on the rise, so preventing the natural result of a lessened supply from this island.

In respect of Cinnamon, it was hoped that a great difference in the shipment of "chips" would be witnessed by this time, but such is scarcely the case, although for some years there has been a gradual decline; we trust the falling-off may be much more apparent by and bye. Here is the return:—

	lb.		lb.
1885-6 ...	1,629,548 *bales*;	...	548,037 *chips*.
1886-7 ...	1,793,893 „	...	505,951 „
1887-8 ..	1,657,424 „	...	496,887 „
1888-89 ...	1,857,865 „	...	466,401 „
1889-90 about	1,830,422 „	...	434,415 „
1890-91 (Est.)	1,850,000 „	...	300,000 „

In Coconut Oil, we have a varying and yet on the whole wonderfully steady export:—

	cwt.
1885-6	234,308
1886-7	304,478
1887-8	385,758
1888-9	327,430
1889-90 (about) ...	307,349
1890-91 (Est.) ...	320,000

Finally in regard to Ceylon's one mineral of commercial importance that appears among our staple returns—Plumbago—(although it is no secret how large and valuable is the quantity of precious stones dug out every year and quietly disposed of)—the export figures for Plumbago indicate a wonderful development of mining:—

	cwt.
1885-6	190,153
1886-7	234,473
1887-8	254,046
1888-9	379,290

1889 90	(about) ...	405,429
1890-91	(Est.) ...	400,000

We trust then that the season just entered on may be a busy and prosperous one for both European planters and native agriculturists and miners.

STAPLE EXPORTS FOR THE OLD COMMERCIAL SEASON.

We have now had our monthly export tables corrected at the Customs up to the end of September as follows:—

1889. Months.		Coffee Plantation. cwt.	Coffee Native. cwt.	Coffee Liberian cwt.
January	...	10,941	1,868	19
February	...	12,283	1,861	72
March	...	4,567	799	65
April	...	1,313	1,582	97
May	...	1,215	852	70
June	...	4,139	867	113
July	...	7,533	25	51
August	...	11,608	181	90
September	...	2,917	131	85
October	...	2 415	121	8
November	...	5,666	263	13
December	...	12,610	142	21
		77,207	8,697	707
1890				
January	...	19,857	966	258
February	...	16,615	131	82
March	...	10,463	666	497
April	...	1,578	1,380	401
May	...	3,056	726	734
June	...	4,803	524	255
July	...	6,797	256	194
August	...	4,324	42	207
September	...	1,920	314	87

1889. Months		Tea. lb.	Cocoa. cwt.	Cinchona. lb
January	...	2,663,041	3,915	1,076,700
Februar	...	2,089,615½	2,328	834,106
March	...	3,522,929	1,733	813,345
April	...	2,631,082¾	540	1,026,177
May	...	3,600,608	227	827,732
June	...	3,685 857	1,130	559,196
July	...	2,702,241½	1,210	365,758
August	...	2,729,904¼	1,553	1,035,451
September	...	1,604,147	412	659,977
October	...	3,030,324	45	675,818
November	...	2,615,628	274	735,903
December	...	2,847,231	5,262	715,562
		33,752,612	18,629	9,325,728
1890.				
January	...	3,293 325	3,905	520,311
February	...	3,156,583	2,111	741,815
March	...	3,407,883	1,937	796,090
April	...	4,122,827	1,338	699,921
May	...	4,791,586	906	874,650
June	...	4,996,417	633	617,942
July	...	5,256,538	1.077	658,982
August	...	3.400,975	697	978.762
September	...	2,944,883	83	610,847

Although there has always been a discrepancy between the Customs and Chamber's reckonings, it is of interest to see how the additions work out from Oct. 1889 to Sept. 1890 in the above tables. Here are the Results:—

Exports by Customs monthly report.

TEA .. 1st Oct. '89 to 30th Sept. 90=43,864,233 lb.
COCOA .. " " " 18,268 cwt.
CINCHONA BARK " " " 8,686,243 lb.
COFFEE:
Plantation 90,104
Native 5,436
Liberian .. .. 2,757 98,297 cwt.

In all these cases save Cinchona Bark, the Customs returns show higher figures than the Chamber's returns, for the exports.

LIGHT PLOUGHS FOR CEYLON

Trials of various kinds of bullock ploughs for use in India and Ceylon have taken place with more or less success, and at the present moment further reports on their use are looked for. The obstacles to their use are well known, and some, if not all, of these have been overcome; there is one, however, encountered in the prejudice of the native cultivators, which will require a long course of practical demonstration to overcome. The price has been brought down to almost the lowest possible limit, the means of repairing the simple implements manufactured by Messrs. J. & F. Howard are provided, and the amount of work done is excellent.

The Sailapet Plough is a very good and useful implement, but when tried against Messrs. Howard's Simbaleso Plough is found wanting, as testified by Mr. G. S. Williams, the then Government Agent, Kurunegala, who prefers the latter by reason of its extreme lightness and its capacity for cutting a better furrow. In South India a lighter plough has been introduced by Messrs. Massey & Co, of Calicut, and tried in a variety of districts with partial success. The Collector of South Arcot in reporting on these says he considers that their price is the great objection to the introduction of improved ploughs, and suggests that either Government should manufacture ploughs and tell them at cost price, or train local artisans in technical schools to manufacture efficient and at the same time cheap ploughs. He alludes also to the act that the *ryot does not as yet appreciate the value of time*, which is a great factor in estimating the value off improved ploughs; it is cheapness that attract them.

Practically the same difficulties have cropped up in all places; the cultivator fears, or pretends to fear, that the improved ploughs are too heavy for his cattle; the prices asked, though perhaps low enough in themselves for the articles offered, appear high to a villager who ordinarily spends but little cash on the purchase of a plough; the novelty of the implement renders the local smiths doubtful of their power to repair the ploughs; these men also discourage their introduction from fear of losing their customary payments for repairs; and finally, too often, much is both expected or exacted from the ploughs, and disappointment follows.

The Director of Public Instruction in Ceylon is doing much good work in endeavours to popularise improved light ploughs amongst the natives, and now that the cultivation of cotton and tobacco is being taken in hand by European planters, more attention may be given to the ploughs manufactured by Messrs. Howards.

As regards the native's objection to English ploughs, and his ignoring the great gain in the saving of time by their use, it would be well to point out to him in what way the value of time saved becomes an important factor in the calculation as against cost. The cultivator knows well enough how often scarcity of ploughing cattle from murrain or sickness amongst the village herds, hinders work in the field, losing half the time required for ploughing, and so causing the sowing to be too late, to the loss of many a field of unsown faddy; whereas had the work been put through quickly, the whole extent of tillage might have been accomplished within the time of the rainfall. It too often happens that cattle cannot be hired for any sum, so great is the demand at ploughing time. Then it is that an improved implement doing the work in half the usual time, would be of infinite value, and amply repay the cost. We feel confident that if this advantage of the improved English plough over the ordinary village implement were impressed on the cultivators' attention, it would be more generally adopted than is now the case. In South India many hundreds of light English pattern plough are being worked with advantage, yet at one time in no part of the East was the prejudice against them stronger than in the Indian Peninsula.—*Ceylon Advertiser.*

TOBACCO COMPANIES AND TOBACCO SOIL.

THE eagerness with which capitalists and planters are taking up the cultivation and preparation of tobacco in Ceylon and elsewhere, is almost equal to that with which others are investing in auriferous

land in South Africa. Perhaps a few words of caution on this subject may not be out of place in the columns of a periodical devoted to the interests of Ceylon industries.

As regards climate, there is such a variety in the island, from the very humid to the extremely parched, to be found in western and south-western localities on the one hand to the northern and eastern on the other, that there should be little difficulty in meeting with what is required. As for soil, however, the matter is not so easily settled, for there can be no doubt that none but fairly rich land is likely to produce good tobacco for a series of years. In Ceylon there is very little coming under this denomination in the majority of districts, and there is the probability that even where the land is well suited to the cultivation of the plant, that it must, after a short time, be assisted by artificial means. Those means are, according to experts, a supply of lime, phosphates and animal and vegetable manures.

The present range of prices for fine "wrapper leaf," from 1s. 6d. to 2s. 10d., will doubtless enable a good deal to be done in the way of manures, but we would advise intending planters not to reckon on a continuance of such figures. The planting of new land with tobacco in Sumatra, Borneo, Ceylon and Jamaica must, as in the case of tea, lead to the over supply of fine tobacco, one leaf of which suffices for wrappers for several cigars.

It is more than probable that the conviction of this in the minds of some of the largest proprietors of tobacco estates in Sumatra is the true explanation of so many of them disposing of their properties to Limited Companies. We have heard of another reason for this change of proprietorship in the decreasing fertility of the soil, caused by the exhausting nature of the cultivation.

That in the future, near or remote, there will be any falling off in the demand for tobacco of ordinary quality we do not apprehend; the habit of smoking is too deeply implanted in the rising generation to allow of any such foreboding, beyond which there is the additional reason for a continued expansion of the trade in the growing fashion of cigarette smoking amongst ladies. At the same time we are bound to confess that of late years there has been a marked deterioration in the quality of cigars sold in this country, far more so than in the quality of cut tobacco used for cigarettes, so much so is this the case that unless a very high price is paid it is almost impossible to obtain a pleasantly smoking cigar.

The reason of this falling off in the flavour of ordinary cigars is that the employment of a fine quality of "wrapper leaf" for the outsides of cigars enables the manufacturers in this country to palm off the veriest rubbish of leaf in the inner portion, the inferior quality of which is only apparent when it is being smoked. The Ceylon Tobacco and Cigar Company will do well to avoid this palming off inside rubbish by means of a fine looking wrapper, and adhere to a good selection of well-cured leaf throughout.

The inferiority of cigars generally, and the very high price demanded for anything like quality in the article, have led to an enormous increase in the demand for cigarettes, for which a medium description of cut leaf is required, and this must sensibly restrict the use of wrapper leaf. It is worth while for Ceylon tobacco planters to take note of remarks made by the British Consul at Amsterdam on the trade in Sumatra tobacco at that port, which he describes as very unsatisfactory to importers. The quality of the crop was not so good as in previous years, the plant not having fully developed. There was, in consequence, a much larger quantity of dark-coloured and second-class tobaccos among the importations, and the light-coloured kinds, which command high prices, were comparatively scarce. There was a large crop, and the few lots of fine quality fetched high prices, but the rest had for the most part to be sold at rates which were exceedingly discouraging to importers. The more favourably-situated plantations still gave good results, the dividends for 1888 being excellent, but so serious a drop in the prices of tobacco affected many undertakings still struggling with difficulties, and some of them have already gone into liquidation. It has been stated that this falling-off in quality is due to a great extent to exhaustion of soil, just as in the Western States of America, wheat crops are decreasing.

In another place will be found an interesting account of the cultivation, curing, and manufacture of Mexican tobacco in the State of Vera Cruz, from which it will be seen how much pains are being taken in the development of the industry in that country. The remarks in question point to the fact that those planters who combine the manufacture of cigars with that of tobacco-growing and curing, realize very large profits.—*Ceylon Advertiser.*

THE COCOA BEETLE.—Agriculturists of this island, says the *Chronicle* of St. George's, Grenada, continue to be considerably exercised over the cocoa beetle, and well they may, for the pest is extending its ravages in all parts of the island at an alarming rate. Acres upon acres of trees, chiefly of young growth, have already fallen victims to the destructive insect, and many more are threatened. The Commission appointed by the Governor to inquire to what extent the beetle is destructive to the trees, and to determine upon measures for its destruction, has commenced its inquiry, but when that will terminate it is hard for us to say. One or two planters have set an excellent example to their brethren by employing boys and girls to go through the fields and destroy the larvæ and the beetles wherever they are detected.

KALUTARA, Sept. 27th.—A case of some magnitude, in which Mr. Simon de Fonseka as plaintiff claimed damages, R1,312·50, from the lessees of his cinnamon estate, Pitagoneliya, for breach of covenants of lease, was heard on the 25th instant, the claim being resisted for the lessees by the Hon. Mr. A. de A. Seneviratne, Advocate, assisted by Mr. Proctor Wijeratne. The plaintiff was represented by Mr. Walter Pereira, Advocate, assisted by Mr. Proctor de Silva. After a lengthened investigation, during which the evidence of the headmen, who had assessed the alleged damages at plaintiff's request, was led for plaintiff's side, judgment was reserved, and was pronounced yesterday in favour of plaintiff for R1,200 and costs. The breaches complained of were that drains were not well opened out and kept clear, so that cinnamon bushes were detrimentally affected by water being allowed to remain stagnant; that tender shoots were cut; and that weeding was done in a very unhusbandmanlike manner. Mr. Jardyne, a cinnamon planter from the Negombo District, having inspected the land at the plaintiff's request, gave evidence for the plaintiff. The judgment is likely to be appealed against.

TRAVANCORE TEAS SOLD IN COLOMBO.—At yesterday's (Oct. 2nd) public sales of tea a small invoice of Travancore tea, brought down by B. I. steamer, was catalogued, and, though not sold in sale, afterwards realized high prices privately. The tea was catalogued by Messrs. Forbes & Walker, and the following particulars are gathered from their catalogued:—

PENSHURST.

14 hf-chs.	Bro. Pekoe	...	910 lb...76 c. bid
6 „	Pekoe	...	300 lb...53 „
17 „	Pek. Sou.	...	765 lb...41 „
6 „	Unassorted	...	300 lb...45 „
43 hf-chs.			2,275 lb.

The tea is described to us as very well made, and altogether an attractive parcel, as the prices bid in the room testify. Higher prices were paid privately after the sale, and the proprietor of the estate ought to be well satisfied with the result of his experiment in sending his teas to Colombo for sale, where they meet with ready competition from buyers shipping to all parts of the world. We hope that we shall not only see Penshurst teas continue to be sold on our market, but also that other Travancore proprietors will follow this excellent example and send their teas to Colombo for sale, where full value can always be obtained for them.

WYNAAD COMMERCIAL PRODUCTS.

At the meeting of the South Wynaad Estates Company on the 29th ultimo, at the Offices of the Company in London, Mr. A. R. Hinde spoke as follows:—

When first asked by Mr. Spain to assist in the resuscitation of this company, I did it with a view to planting tea, but my views were overridden by the advisers of the company in India, who preferred to go in extensively for planting ledgers, which, I think, was a mistake. At the same time, it is but just to them to say that at that time there was scarcely a man in the Wynaad who would have endorsed the views I held with regard to the cultivation of tea. But now you find that one of the principal shareholders in one of the Wynaad mines has been out to India and has come back strongly urging that his company should plant the whole of its estates in this way. On the Ouchterlony estate, almost adjacent to your property, they have gone to the extent of planting 1,200 acres with tea, and the manager of the two companies that have already written with regard to having joint works, Mr. Patterson, is so satisfied as to the result of tea cultivation that I believe, or at least I think, he has written home to his companies urging them to cultivate their spare lands with tea. Mr. Hamlin, who is now the manager of the Oriental Bank Estates in Ceylon, and who has had, therefore, exceptional advantages of knowing what tea will do, and who has had a still longer experience of the Wynaad, tells me he calculates there is nothing in Ceylon that can beat Wynaad as a tea-producing country, and that the one fear Ceylon has is that Wynaad will embark extensively in tea cultivation. I may safely say that there is only one estate in Ceylon that yields anything like the results obtained in the Wynaad. On the Ouchterlony Estate there was produced 600 lb. made tea per acre, and on an estate abandoned for coffee they are getting an average of 800 lb., and upon the Periashola Mr. Minchin has ¾ of an acre of this tea, and tells me that he got 800 lb. of made tea from even that quantity of land. It is upon the yield of tea that everything depends, and I calculate, and think I have allowed a liberal margin for everything, that you can put your tea on the market here and sell it at 6*d*. per lb. and if carefully prepared, it should realise fully 1*s*. per lb., which will give you on the 150 acres it is proposed to plant, an income of £1,000 a year.

THE PLANTING OF PEPPER.—I also advocated. It has been adopted on a good many estates, where it is planted in conjunction with coffee. There is a drawback, because you have to coppice your standards once a year, and that is injurious to the coffee, but I have seen vines growing upon Mr. Walker's estate at Perengodda, the yields of which was sometimes extraordinary. The question that arose was whether our pepper would be equal to Malabar pepper grown below the Ghauts. The first pepper brought a higher price than any on the market, and the natives are turning their attention to its cultivation in the Wynaad. If you grow the pepper amongst the tea, you have to coppice the tea, and therefore you do not injure the tea one atom. You would get the whole of the profits of the vine at no cost, because the cost of cultivation is borne by the tea, so that all you have to pay is the outlay in harvesting. I propose that the precaution be taken of planting through the cinchona these standards also, so that if by possible chance you did get canker then you would have the pepper vine standing, and by the time your ledger has given out you would have a pepper estate in its place, which would subsequently be planted with tea. I think I have given fair and reasonable grounds for saying that the prospects of the company are good, because you can calculate something like £60 an acre profit from your tea land when it has come to maturity. You will get tea (so well has it come on) within nine months from its being planted in the open.

On the cinchona I have placed apparently a high value, but the figures are based upon actual returns obtained, and figures as given to me by the leading planters in the Wynaad. I have calculated simply 4 lb. of dry bark to the fully matured tree, and that it will yield you only 4 per cent. of quinine, though I have had an analysis of 11 per cent., and I have taken the inside value of that at 2*d*. per lb., so that I do not think I have been guilty of over-valuation, especially as 7 per cent. would be about the actual produce. The market for cinchona is perhaps lower now than it has ever been, and I have the assurance of Mr. Hamlin (and there is nobody more qualified to speak than he) that the visible stocks of cinchona are simply kept up by the destruction of the plantations—a fact that the consumer does not know —and it is only the question of a year or two when of necessity you must have a rise in the value of your bark, which I have not discounted in the slightest degree. In the Wynaad the same process is going on. I should think there is a material reduction in the actual acreage under cultivation, and practically not a single acre has been put in to supply what has been destroyed, because the low prices do not induce plantation. Moreover, the actual area from which bark can be successfully grown is exceedingly small. In Ceylon it will not grow except in a few favoured districts, and when I tell you that 40 or 50 acres of ledger embrace the whole of it, you may fancy how limited is the area upon which it can be produced. The result will be that probably we shall have Cinchona at as many shillings per pound as it now is in pence. With regard to coffee I can support all that Mr. Gramshaw has said. When you took over the estate the coffee had been so neglected that they actually had to take axes and cut down the trees to the destruction of much that was valuable. I do not know any other place in the Wynaad that would have stood such treatement, because at the present time, with the exception of the Ouchterlony, that is the best; and that estate is notoriously good. What the chairman has told you as to the cost and trouble of bringing this estate round is perfectly correct. With regard to tea it had been so abandoned, and was actually burnt to the ground. The jungle has now been cleared away, and Mr. Punnett has written to say that as regards tea there has scarcely been the failure of a single tree. All the mining operations took place above what is now the cultivated ground and the *debris* was thrown upon it. I think it is a healthy tea and when we no longer require the plant for seed purposes it can be cut down and commence to yield probably 800 lb. of tea per acre. (Hear, hear.)—*Madras Mail*, Sept. 25th.

FROM THE MEDITERRANEAN TO LAKE TCHAD.

The *Nouvelle Revue* has an article on the Trans-Saharan railway scheme. The writer warmly espouses the views expressed the other day by Mr. Stanley. France must construct a railway, and construct it soon. The moment for action has arrived. The economic future of France is, more or less, entirely involved, and her political importance is no less concerned. Financially, scientifically, diplomatically, the way has been cleared. The great objection to the scheme lies in its name. The Soudan causes everyone to think of Tonquin, of Dahomey, of distant and fruitless expeditions. But there is no true parallel. The base of the project must be Algeria—the goal, Lake Tchad. The topographical conditions are shown to indicate this unmistakably. Lake Tchad is the "enviable port" of French African enterprise. "In order to enter it it is enough to reach the plateau of Ahir in the centre of the zone of influence which Her Britannic Majesty is good enough to recognize as ours. Masters of this point, we hold the African continent strategically from the Equator to the Mediterranean. We cover the Niger and Timbuctoo. Our Senegal will not have to wait long before we join hands with it." The tide of Eastern and Western Islamism, which at present

flows undisturbed across North Africa, will also, it is urged, be broken by the establishment of French influence in a Northern and Southern line, and the new force of the Senoussiya be thus prevented from communicating itself to the Mahommetans of Morocco. The commercial advantages of the railway are of course made the most of. But possible alternatives for the direction of the line seem numerous enough to be likely to keep the construction yet a long time from the range of practical enterprise.—*Review of Reviews.*

COFFEE MIXTURE LABELS.

The thirty-third Report of the Commissioners of H. M. Inland Revenue, for the year ended March 31st, 1890, has just been published, and contains statistical and other information of interest to the trade. As regards coffee mixture labels, we note that the following table gives the number of coffee labels issued up to March 31st, 1890, and the amount of revenue received :—

	½d Labels	1d labels	Net amount received		
	No.	No.	£	s.	d
England... ...	548,917	269,084	2,264	15	2
Scotland... ...	12,782	6,286	52	16	5
Ireland	45,864	4,820	115	12	8
	607,563	280,190	£2,443	4	3½
Year 1888-89	670,050	309,828	2,686	17	9
Decrease...	62,487	29,638	£2[illegible]3	13	5½

The following table gives the receipts since 1882-83 in which year the duty was first imposed :—

Year	½ lb. Labels No.	1d labels No.	Net amount received £	s.	d
1882-83.........	1,440,305	802,434	6,314	2	2½
1883-84	1 432,203	645,429	5,673	0	10½
1884 85.........	1,1[illegible]0,664	539,893	4,563	8	9
1885-86.........	1,021,868	446,525	3,989	8	3
1886-87.........	799,914	370,971	3,212	4	0
1887-88.........	704,862	332,921	2,855	12	8
1888-89.........	670,050	309,828	2,686	17	9
1889-90.........	607,563	280,190	2,433	4	3½

The Inland Revenue Commissioners add to these tables the following significant note :—"The continued reduction in the revenue arising from these tables still, in our opinion, results from the unpopularity of coffee mixtures and substitutes for coffee."—*Grocer*, Sept. 6th.

THE FOOCHOW TEA TRADE: GREAT COLLAPSE.

If one half of the stories reaching us about the trouble and distress amongst the Teamen are true, they reveal a very sad state of affairs. Men, hitherto well to do, are ruined. Homes have been broken up by the score. Wives and children have been sold, and many suicides committed. One of the most painful cases brought to our notice is that of a whole family of eight, reduced to a state of utter destitution, taking their own lives by eating opium. But indeed all the stories are more or less heart-rending. These men have our sympathy. They have never come into contact with foreigners and therefore had no opportunity of hearing what was going on in the outside world. They knew nothing of the great depreciation of values in the foreign markets, any more than they did of the great American Silver bill which was to affect their interests so disastrously. All they had to guide them was the course of prices in this market last season. They could not foresee that they would have to take 30 to 40 per cent under those prices on the average, as they have had to do. If we are righly informed, there are few, if any, of these men who can escape ruin. Capital has been sunk, and what remains is now in few hands; and credit will be very charily given after late experiences. There will be changes and probably very important changes in the working of this part of the industry. It goes without saying that the ruin of the teamen has not come about without very considerable loss to the hongmen. Several of the Hongs indeed will have to close their doors. The consequence will be, that we shall have the small supply of this season still smaller next; and if the annual falling off is to continue on its present scale, the future of Foochow is gloomy in the extreme. But we will not despair. We have before given it as our opinion that, with these high exchanges, we can lay down tea cheaper in London than the India and Ceylon producers, and if we can only fight those countries with their own weapons, and pander to the popular taste by sending them machine made teas, we should have better times to look forward to. The foregoing consideration of getting the natives to make tea by machinery suggested itself after hearing of a telegram from London advising that 'Foochow Congous were not wanted.' It is evident that something in the shape of novelty is necessary to catch the popular taste, and this form of novelty or reform would appear more easy of attainment than the previous suggestion of the government employing Indian planters to instruct the natives in their special mode of cultivation and manufacture which has proved so successful. The proposal is to make a trial. It would not apply to our Specialities, namely Sonchongs and Flowery Pekoes; and probably some other district teas should continue to be made as they are at present.—*Foochow Echo*, Sept. 18th.

BARK AND DRUG REPORT.

(From the *Chemist and Druggist.*)

LONDON, Sept. 11th.

CINCHONA.—At Tuesday's auctions a moderate quantity of bark was offered, the total being as follows :—

	Packages		Packages	
Ceylon cinchona	1,160	of which	877	were sold
East Indian cinchona	282	do	199	do
Java cinchona	55	do	55	do
S. American cinchona	1,202	do	81	do
Total	2,699	do	1,212	do

Among the bark offered were a good many second-hand parcels of Eastern growths, and nearly 700 bales Cuprea, which were once more placed on sale in the hope that the improved value for the article would enable holders to obtain their limits. Such was not invariably the case, however, and several parcels were bought in at more or less nominal rates, though a small concession on the part of the holders would in several instances have led to business. The Cuprea bark appears to be held at prices considerably in excess of the present market value, and none of it was sold. A very satisfactory amount of competition was manifested during the auctions, although only one firm bought very largely; and the general opinion is that prices, though slightly irregular, were on the whole fully up to the previous auction rates, the average unit being placed at 1⅞d to 2d per lb.

The following are the approximate quantities purchased by the principal buyers :—

	Lb.
Agents for the Mannheim and Amsterdam works	100,346
Agents for the Auerbach factory ...	35,047
Agents for the Brunswick factory	33,209
Messrs. Howards & Sons ...	30,757
Agents for the Frankfort o/M and Stuttgart works	25,943
Agents for the Pelletier factory ...	21,488
Agents for the American and Italian works	16,961
Mr. Thomas Whiffen ...	5,650
Sundry druggists	19,105
Total quantity of bark sold ...	288,506
Bought in or withdrawn	19 ,723
Total weight of bark offered ...	480,229

SOUTH AMERICAN CINCHONA.—Of cultivated Bolivian Calisaya 499 packages were offered, of which 81 (13,230 lb.) were disposed of at 7½d to 9½d for bold quilly chips and somewhat irregular grey quill. A large quantity of old Cuprea bark (699 packages) was bought in, the price asked 3½d per lb., being unobtainable. Four cases low Red bark, dull colourless quill, were also bought in only 3d per lb. being offered for it.

ESSENTIAL OILS.—In Citronella there has been a very good business, and the demand keeps up well, the spot price is §1 to ⅝d per oz.; and business has been done at 12½d per lb. c. i. f. The price cabled from Ceylon is higher, viz. 13⅜d per lb. c. i. f.; while for Lemongrass 1d 9-16ths c. i. f. is required.

COCONUT OIL has advanced in price since last week, and closes very firm indeed. Fine Ceylon oil on the spot is held for 32s 9d, while for shipment near at hand 31s c. i. f., and for distant delivery 30s 6d c. i. f. is required.

QUININE.—Market stagnant. The only business reported this week is a sale of 5,000 oz. second-hand German bulk, at 1s 1⅜d oz. There was some faint expectation that the American Senate might decide to re-establish the duty on quinine during the debate on the M'Kinley Tariff Bill. In that case our market would probably have been temporarily influenced, but, as it is, the amendment to subject quinine to a customs duty was defeated.

HILLCOUNTRY PLANTING REPORT.

THE VALUE OF JARRAH TIMBER—THE "KEW BULLETIN"—THE ECONOMIC PLANTS OF MADAGASCAR.

After I had written at such length on Australian fuel trees,* I opened the latest number of the *Kew Bulletin* and found a notice of the celebrated Jarrah tree of Western Australia (*E. marginata*), in which Baron Von Mueller is quoted to the effect that this is one of the least inflammable trees for building structures and at the same time the very best of the West Australian trees for charcoal. We have some splendid specimens here of this famous eucalypt, the wood of which compares not unfavourably with mahogany, but neither we nor any others who have grown Jarrah trees are likely to convert them into charcoal. The immediate reason for the tree being noticed in the *Kew Bulletin* was that blocks of the timber were being used for paving streets in London. A similar use of the timber in Melbourne is mentioned, but when I was there in 1880-81 I saw blocks of red gum (*E. rostrata*) being laid in Collins Street; and while Victoria is rich in this excellent timber and Jarrah is found only in Western Australia, it is not at all likely that the imported and more expensive wood (probably not better for the purpose) would be resorted to. In the London *Times* I find a condensed form of the information in the *Kew Bulletin* ready to my hand, which I quote:—

JARRAH WOOD.—The new *Kew Bulletin* contains an interesting section on the properties and uses of the jarrah wood, a species of eucalyptus, native to Western Australia. The main difficulties in connexion with its use in this country are the cost of freight for such heavy timber from Australia and its intense hardness, which makes it difficult for ordinary English carpenters' tools to work it. The tree which produces it grows generally to a height of 100 ft., and sometimes 150 ft. It is found only in Western Australia, extending over the greater portion of the country from the Moore River to King George's Sound, forming mainly the forests of those tracts. According to Baron Mueller, when selected from hilly localities, cut while the sap is least active, and subsequently carefully dried, it proves impervious to the borings of insects. Vessels constructed solely of it have, after 25 years' constant service, remained perfectly sound, although not coppered. It has been tried at three places in the Suez Canal, and, after having been down seven years, the trial samples were taken up in order that a report on their condition might be sent to Paris. From certain correspondence between Kew and some London vestries, it appears that jarrah has lately been used by the Chelsea Vestry for paving the King's-road, and by the Lambeth Vestry in the Westminster Bridge-road.

There are few trees about which such contradictory accounts have been given, especially as to its ability to resist submersion in sea water and the attacks of *Teredo navalis*. Conspicuous in the Western Australian Court in the Melbourne Exhibition of 1880 was a fine slab of Jarrah said to have been for 40 years part of a pier at Fremantle and which certainly was uninjured. The result of other trials, however, was stated to be its liability to be bored equally with other trees; but the evidence in favour of the timber largely preponderates. The non-inflammability of the timber renders it specially valuable for shingles. It can be used for the purposes to which *sâl* (*Shorea robusta*) and teak are put, and also where those woods are inadmissible, while it is said to be cheaper. Mr. Allen Ransome reported: "It is beautifully marked, and somewhat resembles mahogany in colour. Railway sleepers, joinery, casks, spokes and hammer handles were made from it. The planed and moulded specimens left the machines with a very fine surface." Like teak its breaking strength is not to be compared to that of the Australian iron and stringy barks. The figure 1,982 for average specific strength, however, is not bad. It attains a great size, exceptional planks having a diameter of 10 or 11 feet. This, like other eucalypts, is liable to the existence on its stem and branches of enormous protuberances, most beautiful slabs of which were exhibited at Melbourne in 1880. Those from the Jarrah are described as rivalling in beauty the finest specimens of walnut or pollard oak. The protuberances occur 6 to 10 feet in diameter.

There is other matter of interest in the September number of the *Kew Bulletin*. Mr. W. F. H. Blandford identified an insect which injured barrel staves as a small beetle called *Trypodendron signatum*, Fabr., "Prickly pear" has spread so in South Africa that legislative measures have become necessary for dealing with. This reminds us that a member of the Madras Civil Service once reported that he found this plant useful as a protection for tree seeds which he sowed in spaces cleared amongst it. We have also seen it stated that if the thorns are burnt off the sliced leaves make good fodder for cattle.—There is an article on the treatment of mildew in vines. The remedy is "Bonillie Bordelaise," a mixture of sulphate of copper, slaked lime and water, a mixture likely to be useful not only as a fungicide but as an insecticide.—There is an interesting account of cultural industries in West Africa But of chief interest in Ceylon, which is supposed to have been once joined to Madagascar, is an elaborate paper on the economic plants of the great African island, by the Rev. Richard Baron, F.L.S., In the prefatory matter it is stated that,

In a valuable paper by the Rev. Richard Baron, F.L.S., on the Flora of Madagascar (*Journ. Linn. Soc.* vol. xxv., pp. 246-294), it is stated that the vegetable productions of Madagascar have been very extensively "explored, and that the majority of the plants inhabiting the island are known to science." The flora of the low lands of the southern part of the island is still, however, the least known. Our knowledge of the flora of Madagascar is due to the labours of numerous botanists from Flacourt, Dupetit Thouars, and Commerson to Grevé, Bojer, Grandidier, and Ellis. Within the last few years this knowledge has been greatly increased through the very successful labours of Mr. Baron himself, and his collections, received at Kew, have been determined and described by Mr. J. G. Baker, F.R.S., It is estimated that whereas until recently less than 2,000 species of plants were known from Madagascar, there are now named and desbribed about 4,100 species,

* See page 353.—ED. *T. A.*

Mr. Baron has been good enough to supplement his paper on the Flora of Madagascar by preparing for the *Kew Bulletin* some brief but interesting notes on the economic plants of the island. These plants are of considerable interest and importance. One of the earliest notices of Madagascar economic plants is contained in Rochon's *Voyage to Madagascar and the East Indies* (English translation, 1793, pp. 280-297). In this work plants from the north of Madagascar, "now transplanted in the Royal Botanical Garden at the Isle de France" (Mauritius), are given under their native names The Ravensara (*Ravansara aromatica*), the Tanguem or Tangena (*Tanghinia venenifera*) and the Filao (a species of *Casuarina*) and many others are noticed. The later tree is quaintly and not unappropriately described as "Equisetum arborescens"

Dr. G. W. Parker, a medical missionary sent out to Madagascar, has recently prepared a Malagasy Materia Medica, with special reference to the use of native plants. This, with determinations made at Kew, was communicated to the *Pharmaceutical Journal*, 1881 vol. xi., pp., 853—855. There are numerous scattered notes respecting the economic plants of Madagascar to be found in other works, but the above appear to include the more systematic attempts to describe them. It may not be inappropriate to mention here that there are still some very valuable plants of Madagascar about which at present we know very little. As shown in the *Kew Bulletin* for May 1888, p. 135, we are not acquainted with the source of Madagascar Ebony nor of Madagascar Sandal wood. There is also the plant which yields Madagascar Piassava. This is doubtless a palm, but not a species of Raphia as is generally supposed.

While much of the flora of Madagascar is identical with that of Ceylon, the great island has far the advantage, and to it we owe, amongst other productions, "the flambeau tree" (*Poinciana regia*) and "the traveller's tree." Mr. Baron recognizes three separate zones, regarding which he states:—

"That the flora of the central region should differ widely from the flora of the eastern and western regions is accounted for by the great elevation above the sea of the central part of the island. But how are we to explain the existence of so great a difference between the floras of the eastern and western regions, occupying, as they do, the same latitudinal and altitudinal positions, for of the 2,206 plants found in the eastern and western regions only 128 (not reckoning the 100 occurring in all the three regions) are common to both. I believe the explanation to be simple. The central elevated plateau of the island, which runs from north to south, is undoubtedly of very great antiquity, having existed not improbably from Palæozoic times, and has therefore always formed a barrier between the floras of the eastern and western regions. The floras therefore, even if they were formerly similar, which is doubtful, have had abundance of time to become differentiated in character; and if they were originally different, they have been kept, by the existence of the mountain barrier, distinct to the present day."

TEA CULTURE TO BE ABANDONED IN CHINA?

The following is from the *Foochow Echo*:—

On account of the distressed condition of numerous tea garden owners in the tea districts, the authorities are advising them to do away with the tea plant and replace it with either rice or potatoes, as these two articles of necessity will not in any way so fatally injure them. We learn that many owners of land at the foot of the mountain, where water is to be had, have readily taken the advice. Opium, we are told, will also be extensively planted. Something must be done no doubt, as tea will never again be able to offer thousands of men the liberal support they derived from the trade years ago.

THE NEW CUSTOMS ORDER.

The announcement by the Board of Customs that tea is to be weighed and tared to the half pound is strongly resented by the tea trade. The *Grocer* says:—The intended change will entail a serious loss upon grocers, who can ill afford it in the present time of extreme competition, and particularly of opposition from civil servants themselves, and we cannot too strongly impress upon our readers the necessity of taking immediate steps of petitioning the Board of Customs and the Treasury against the proposed change. One thing is certain if the trade are to be harassed by the paltry charge of two-pence upon half-pounds of tea, the sooner the duty is abolished the better, and the Customs Department merged with the Inland Revenue, as this will save expenses and loss all round. The large wholesale dealers are stirring in the matter, but the weight of evidence to be brought before the authorities rests with the grocers, who distribute the tea, and they must individually and collectively take an immediate interest in the matter to prevent the change taking effect. Such an alteration should not have been contemplated when Parliament was not sitting, and no opportunity can be taken of bringing the subject before the members of the House of Commons, who passed the Act which imposes the duty of 4d per lb., and does not mention or contemplate the payment upon any fraction thereof.

The Produce Markets' Review says:—With reference to the second portion of the boards' order, the system of selling India teas on average weight has been tried and has been found to be altogether unsatisfactory. It is evidently quite useless for Her Majesty's Commissioner to waste the public time, or order systems to be kept up or altered, which the trade has absolutely refused to buy upon. What is the use of weighing tea by net weights to nominally oblige the importers, when no one will buy it after it is weighed? Here, again, the board acts without consulting those, who are interested, and who understand the subject.—*H. and C. Mail.*

FISH-CURING IN THE MADRAS PRESIDENCY.

The fish-curing operations during the official year 1889-90 show the usual upward tendency of the industry from the period it was taken under Government management. The following figures for the past five official years show the increase from year to year of the fish brought to the fish-curing yards to be salted:—

			Tons.
1885 86	...	...	27,396
1886-87	...	...	30,373
1887-88	...	...	37,495
1888-89	...	...	41,611
1889 90	...	...	43,496

At the beginning of the year there were 149 yards under operation, a new one was sanctioned but not opened during the year, and seven yards which did not turn out enough work were closed, leaving 142 yards open at the close of the year. 11,84,058 maunds or 43,496 tons of fish were taken to the yards to be cured, against 11,32,756 maunds or 41,611 tons in the previous year, showing an increase of 51,302 maunds or 1,885 tons, being 4·5 per cent., which is highly satisfactory. The quantity of salt used in the operations was 1,75,111 maunds, valued at R1,16,278, being at the rate of 12·16 lb. of salt per maund of fish. The quantity used in the previous year being 12 55 lb. per maund of fish. There have been great variations in the quantity of salt used in the various yards, and as no satisfactory explanation can be obtained, an intelligent Sub-Inspector has been ordered to be placed for a time in charge of each yard, to watch the operations carefully. The results of this step will probably elucidate the reason of the variation in the various yards. The total expenditure by Government under all heads in connection with fish-curing operations during the year, was R1,08,149-4-9, while the receipts amounted to R1,16,278-4-2, exhibiting a gain to Government of R8,128-15-5. Since these opereations were taken

under the management of the Salt Department, the Sta e Exchequer has benefitted to the extent of R38,079-0-7, while the general public have been able to obtain a healthy ar icle of diet instead of the rotten and pu ri fish oured with salt earth, etc., hitherto sold in the bazaars. The great opposition shown by the curers to resort to the yards has gradually given way, and applications are now being constantly made to open new yar s. Most of the fish cured passes into general consumption, only about 2,750 tons having been registered as exported by sea.—*Madras Times.*

THE QUARTERLY SALES OF CINNAMON.

These sales were held on Monday last, when only 1,300 bales Ceylon were offered, which at the opening, met little demand, and previous rates were with difficulty obtained, but the competition afterwards improved, as it was seen that several shipping orders had to be executed, and, excepting tho portion "unworked," which was mostly retired, the whole of the above quantity was taken off, prices towards the finish showing and advance of ½d to 1d per lb. on the May rates, especially for the finer qualities, viz.:—Ordinary to fino first at 7d to 1s 2d, superior plantation at 1s 3d to 1s 7d; seconds from 6½d to 1s 1d, finest at 1s 2d to 1s 4d; third at 5½d to 1s; best at 1s 1d to 2d; fourths at 5¼d to 8d, with extra fine at 10d to 11d; and broken, in twenty packagos, at 5½d to 7d per lb.

The details of the marks and prices are as under:—

Marks	Superior and First Quality 410 bales	Second Quality 340 bales	Third Quality 260 bales	Fourth Quality 290 bls.
A | S —— Kaderanc G | P	1s 3d to 1s 7d	1s 1d to 1s 2d	1s to 1s 1d	8d to 10d
FS do K	1s 3d to 1s 6d	1s 2d	1s	11d
F | S —— do W | S	1s 5d	1s 4d	1s 2d	8d to 11d
Hor hena Estate JDSR in diamod K diraue Plantation	1s 2d to 1s 4d	1s to 1s 1d	8d to 10½d	7d to 8d
S D A R Kaderaue Plant tion	1s 1d to 1s 4d	1s to 1s 1d	8d to 9d	6½d to 7d
T R Kaderane Plautatiou	1s 2d to 1s 4d	1s to 1s 1d	8d	6½d to 7½d
F B Franklands	1s to 1s 3d	1s to 1s 1d	11d	7d
A & Co. Ekelle	1s to 1s 2d	10½d to 1s	8d	6½d
D Kader ne	1s 2d	—	7d to 8d	—
A S D, DD Kaderaue Plantation	10½d to 1s	8½d to 10d	7d	6½d
C H DE S, D, in diamond, K	8½d	7½d	6½d	—
Ditto B V		—	6½d	5¾d
C H DE S Bagatelle	8½d	7½d	—	—
A in diamond, Ekelle	8½d	6½d	5½d	5½d to 3d
C H DE S	8d	1d to 7½d	6½d to 7d	—
L F M in diamond	8d	7½d	—	7d
A M K in oblony Ekelle	7½d	6½ l to 7d	5½d to 6d	5¼d to 5½d
M B & Co.	7d	6½d	6d	5½d
C P H & Co.	7d	6½d	6d	—
O S	—	7d	6½d	5½d
F & Co. U Ekelle	8d (bt in)	—	6¾d to 7d	6½d (bt. in
K P Kadcr no	—	—	—	7d to 8d

CINNAM N CHIPS aro in request, and 357 bales and bags Ceylon put forward were chiefly sold at full prices—common at 2½ l, cuttings, quillings, and clippings at 6½d to 7d.

The next series of auctions are arranged for Monday, November 24th.—London *Grocer.*

COMMERCIAL NOTES ON INDIAN DRUGS'

* * *

The word tamarind is derived from tho Arabic "Tam r-Hindi," or Indian date, tho fruit being introduced into Europe from that country by the Arabs. At preseut the most esteemod varioty of East Indian tamariud are tho red ouos from Guzerat, which are worth as much as 50 rs. per kandy, or about 10s per cwt. The pulp is prepared for the market by removing the seeds and epicarp by hand, then mixing the pulpy portion with about 10 per cent of salt, aud treading it iuto a mass with the naked feet. The best qualities are free from fibre and husk, the commonest contain both as well as seed. The seeds, after the outer shell is removed, are eaten by the natives boiled or fried.

Goa-powder was, until 1864, known as a remody only, to the native Christians of the Portuguese possession of Goa. In that year Mr. D. S. Kemp, of Bombay, first called attention to its medicinal value, but not uotil 1875 was the fact finally established that Goa-powder was identical with the ararcba of the Brazilians Now Goa-powder is known as a rin worm r medy all over India, and one wholesale drug house in Bombay alone imports over a ton of it every year. It is sold under the names of ararobine, chrysarobine and Goa-powder.

* * *

The sappan-treo is cultivated in the Madras presidency; and it is stated that it is tho practice among tho Thean families, whenever a girl is born, to plant a certain number of sappan-trees which are given to her as a dowry upon her marriago. Sappan-wood is largely used as a dye. The natives do not seem to employ it medicinally but at the Bombay Medical Depot it is now u e l in the place of logwood. Three qualities aro known in the market, Singapuri, Dhunsari, and Ceylon, the last-named being the most inferior.—*Indian Agriculturist.*

PLANTING IN PERAK; STRAITS SETTLEMENTS.

(By Mr. J. F. M. Cock.)

GENERAL REPORT ON PLANTING BY THE SUPERINTENDENT GOVERNMENT PLANTATIONS.—On viewing figures presented along with this report, the question naturally arises what benefit has been derived from the expenditure? That there was no adequate roturu iu revenue has always been apparent, and the collapse of the coffee crop in 1888 was met by a reduction in expenditure. At one time it was proposed to manure the whole of The Hermitage, but wheu the actual cost aud dubious result were duly weighed the proposal was dropped. Similarly, we could have continued tea manufacture at Cicely, but the tea would all have had to bo drained aud manured, and the purcbase of a new rolling machine was demanded by the report on the twist of the leaf.

Everyone interested knows that coffee has grown of the finest quality iu this State, and can seo it growing on Waterloo now. The tea made at Cicely was reoognised by the whole commercial world as a good us ful tea, but no one well advised would put money into tea in Perak. Till the results named above—viz., the production of a first class coffee and a well-priced tea had been attaiued—the expenditure incurred was justified by what had been already spent on the planta ions. Nothing has been spent this year except on necessary buildings, grass fields, roads and drains, on the curing and dispatch of the coffee crop, and dispatch of the tea crop of last year. Next month I shall pack up the balauoe of the tea to be ready to be shipped off wherever it shall be dotermiucd to send it.

In tho end of June Mr. Li Chin Ho took over the tea on Cicely and Tho Hermitago on behalf of the lessees, Mr. Li Peh (his father) aud Mr. Ah Kai. He is working monthly labour at present. If the lessees hold out till others are encouraged to join them on the tribute system this experimont will be a success. At present money is all going out, nothing coming in.—*Perak Government Gazette.*

A CEYLON COFFEE PLANTER tries to eclipse the gaiety of nations by alleging that the failure in the Ceylon ooffee crop is due to permanent causes, which operate in South America as well, and that coffee will soon bo an unknown beverage. Are the stars in their coursos fighting against the great cause of temperanco? *Brooklyn Times*, Sept. 12th. [Refers to interview with Mr. Grinlinton published in the New York *Tribune.*—*Cor.*]

GIRDLING FRUIT-BEARING TREES.

According to the American journal *Science*, some highly interesting results have been obtained at the Agricultural College in Massachusetts from the girdling of fruit trees. A row of crab-apple trees was selected. Three were girdled by cutting out a ring of bark one-eigth, a quarter, and a half-inch wide at the ground; three more were girdled to the same widths just below the main branches, and others on one or more of the main branches. All the girdles made near the ground healed readily and completely; those on the main trunk healed less completely, but sufficiently to ensure a good growth of tree; those on the branches healed less completely still, and in two instances the new growth failed to meet and the branch died in the spring. All showed a marked increase in fruitfulness over those not gridled, and little difference was observed in the effect of the various widths. But no definite conclusion can be drawn yet as to the consequence of this treatment on the permanent health of the tree; observations for many years can alone determine this point. A series of experiments made at the same place ten years ago showed that by removing a ring of bark early in July from fruit trees the ripening was hastened one or two weeks, and that the increased size and early maturity were not obtained at the expense of the quality.—*Ceylon Advertiser.*

BOYCOTTED BANANAS.—Considerable amusement, not unmixed with alarm, has been created in Queensland by reported political pressure brought to bear upon the Victorian Government with a view to the virtual exclusion of bananas from the Melbuorne market. Southern fruit-growers complain that the apples and pears grown in their orchards cannot compete against the toothsome banana under present conditions. First rate bananas are sold from hand-carts in the streets of Melbourne at 3d and 4d a dozen, or relatively cheaper than Victorian fruits, and the tropical luxury has been established as a prime dessert favourite This state of things led to an agitation for the imposition of a prohibitive duty on bananas, and at a recent conference of Victorian fruit-growers it was decided to ask for a duty of 1s a bunch. Mr. Cowley promptly communicated with the Melbourne authorities, with the satisfactory result that it if now understood there is no intention of acceding to the demands of the jealous pomologists. The importance of the matter to Queensland may be guessed from the fact that our exports of green fruit—principally bananas—last year amounted to a money value of £36,778, of which sum the shipments from Cairns represented £16,666, while Brisbane was credited with £12,074. The incipient trade indicated by these figures would have been well nigh crushed if the Victorian fruit-growers had succeeded in their object, but the danger is now past. It was, to say the least of it, a curious conspiracy to prevent people eating that of which they had become fond, and forcing them to return to the more insipid products of a temperate climate. In some respects the project reminds us of the plan advocated recently in an American State for the purchase by the Government of all the whisky made in the country and the issue of legal tender certificates to the value of the purchase money. The whisky would improve with age, it was urged, and the Government would thus be the gainer. But the distilling industry failed to gain the desired protection, and so have the apple and pear men. Where people prefer beer or tea, or develop a taste for bananas, it is certainly better to leave them free to gratify their inclinations.—*Queenslander*, Aug. 23rd.

DOOARS, DAM DIM, Sept. 19th.—During the past week the weather has been about the finest we have had for tea, since the season commenced. Outturns are in consequence looking brighter, but it is now too late in the day for estimated yields to be expected. A heavy thunderstorm last night, with a perfect deluge of rain looks as if we were at the last "kick" of the rains. Very heavy thunderstorm on Thursday night twelve inches of rain fell in as many hours; green fly, mosquito red spider all flourishing; weather cool except two or three days.—*Indian Planters' Gazette.*

TEA NOTES.—Debra Dun, Sept. 9th.—Rain is badly wanted. We have not had half an inch of rain since the 20th August. We shall only make about a half tea crop this year. The rice and other crops are suffering from want of rain. Mangaldai, Sept. 9th.—At last there is a fair flush, but it has come too late for many to make up their decrease. Road to steamer ghât quite impassable; this generally seems to be the case with roads directly under the P. W. D. Seleng, Sept. 7th.—Only ·84 rain in week, making to date 54 in. against 96 in. last year. So this promises to be the shortest on record as last year was highest. Leaf plentiful. Good outturn for month expected. Rumours that a short crop is expected. Something of the kind wanted to raise the prices. Burregong, Sept. 7th.—We have just enjoyed a week's weather that has given no cause for complaint, and leaf is making a decided effort to again struggle through mosquito blight and green fly. Although many of the concerns will never be able to make up the tromendous decreases, prospects are less hopeless than they were ten days ago.—*Indian Planters' Gazette*, Sept. 16th.

SCHOOL OF FORESTRY.—A deputation from the Associated Chambers of Commerce waited upon Mr. Chaplin (with whom was Sir James Caird) at the offices of the Board of Agriculture, in St. James's Square, for the purpose of urging upon him the desirability of establishing a National School of Forestry. Colonel Hill, addressing Mr. Chaplin, said those who were with him desired to point out that the growing of timber as an industry might be most usefully extended in this country, especially in view of the timber supply from abroad becoming more and more diminished. They recomended, therefore, that Her Majesty's Goverment should estabish a National School of Forestry which would be an encouragement not only to the planting of Crown lands with trees, but would also induce private landowners to utilise ground which was at present of little or no service in the same direction.—Mr. G. Harper next spoke, and said he had received letters approving of the objects of the deputation from Lord Basing, official verderer of the New Forest, Sir Edward Lechmere, and other gentlemen. He further pointed out that, with the exception of Spain, this was the only country of any position that did not have National Schools of Forestry. England was the greatest timber-buying nation in the world, and at present imported annually something like £13,000,000 worth of that commodity. There wss a vast acreage of land now lying waste in this country which might were the proper instruction forthcoming, he used for timber growing, and partically enable it to produce all the timber it required.—Mr. Chaplin said there could be no doubt of the growing interest and importance of the question under discussion. The purport of the remarks he had heard seemed to be that his department should establish a National School of Forestry. He desired, however, to point out that the Act under which that department was instituted provided only for its inspecting and reporting upon schools which provided education either upon agriculture or upon forestry. So far as he could see, his department had no power to institute a school, but he would consider the matter very carefully, with a view to seeing if he could recommend such a course to the Government. Before he did this, however, he should like to obtain some further information upon the climate and soil of the waste land which Mr. Harper had said it would be possible to turn into profitable forest land.—*Gardeners' Chronicle.*

THE VELLUM PAPER manufactured by the Insatsukyoku deserves to rank among the curiosities of Japan. It is made from a tree called Mitsumata. The tree is easily cultivated and grows quickly. At three years of age, the pruning can be used for paper making. In appearance the vellum paper is rich and glossy, its colour cream-like and its texture fine. It is as pliable and thin as the best writing paper, but so enormous in its strength that four people can grasp the corners of a sheet and raise a man standing on it.—*Madagascar News.*

THE DOUBLE COCO-NUT.—There are several Nuts of this extraordinary Palm, Lodoicea Seychellarum, in an advanced stage of germination at Kew. One of them has already produced a leaf, and has a mass of healthy roots, whilst two others are bursting into leaf. There is now, therefore, a prospect of our seeing this Palm among the many species which are the most striking features in the great Palm house. The process of germination in the Lodoicea is exceptionally slow. In its native habitat the Nut is said to be about two years, after falling on to the ground, before it produces its first leaf. The leaf on the Kew seedling is 2½ ft. long by 2 ft. broad, and it is folded double laterally, so that if spread out it would measure 4 feet. It is divided along the top into about forty segments the texture is unusually stiff and leathery even for a Palm.—*Gardeners' Chronicle*, Sept. 13th.

INDIA THE HOME OF THE SUGARCANE.—In the great German work of Dr. Lippmann, according to the *Sugar Cane*,—

He quotes Decandolle and Miquel to the effect that it is undoubtedly a fact that the whole of the wild kinds of the genus *Saccharum*, perhaps with one single exception, belong to India. The whole of the varieties of the true sugar cane (Saccharum officinarum) even those which by many botanists are regarded as independent varieties, as, for instance, the Chinese sugar cane (Saccharum sinense) point to the same origin. Botanical reasons also require us to look for the home of the sugar cane in India, and the occurrence of almost every wild variety of saccharum in Bengal, the oldest name of which—Gaura or Gauda—is derived from guda —is derived from guda or raw sugar (modern, *goor ?*) and whose inhabitants call themselves "the men of the red sugar cane," points in the same direction.

The original stock of the sugar cane is, we are told, no longer known, nor is it believed to exist in a wild state. This deduction is based on the united testimony of all who have written on the subject. Dr. von Lippmann alludes to the idea formerly prevalent that the sugar cane was *apogamous*, and to the experiments and discoveries of Soltwedel and Harrison, but does not consider that any of these shake the theory of an Indian origin.

The mention of sugar in the earlier Indian writings, the Institutes of Manu, and the great epics of the *Mahâbhârata* and the *Râmâyana* is alluded to, and the probable age of these discussed, and the name applied to the sugar cane and its juice are given. As regards the time when solid sugar was first manufactured only two data can be given, viz., the reception of sugar cane as tribute in China in the 4th century, and a remark of Hiuen-Thsang, who travelled in India in the first half of the 7th century, distinctly mentioning both syrup and solid sugar, as also the fact that solid sugar was obtained in Northern India from the sugar cane. From these Dr. von Lippmann deduces the opinion that the discovery of solid sugar must have taken place between the 4th and 7th centuries, nearer the latter than the former.

In connection with the above we would refer to the interesting discussion of the subject by Col. Yule in his *Hobson-Jobson* s. v. "Sugar." The Sakya tribe, to which Buddha belonged, claimed descent from the first king of Ayodhya named Iksvāku (in Pāli Okkāka, Sinhalese Okā), which means 'sugarcane.' The Sinhalese kings claimed the same honour.

SUGAR.—In respect to the sugar crop of Guiana, we learn this week that competent authorities estimate that this year's crop of sugar will fall 30,000 tons below that of last year. This falling off is ascribed to the same cause as at Trinidad, namely, the very heavy rains.—London *Grocer.*

CEYLON ENTERPRISE is thus noticed by "Peripatetic Planter" in the *Indian Planters' Gazette* :—

It is good for reflection to note how much Ceylon enterprise is ahead of Indian enterprise in the Tea matters. Almost every day one meets with instances. In the smallest suburban Grocers' shops, and in all-sorts shops of country villages, one can always find Ceylon tea in original, estate-packed fancy packages. It would be a rare thing to find an Indian *estate-packed* packet. Yet by this means the Ceylon men are sure their Teas are not being spoiled by an admixture of China Tea, and that full justice is being done them, and that their reputation is in their own hands, and not in that of all the intermediary between the Indian planters and the consumer. The way in which Ceylon estate-packed packets have become procurable in the smallest villages within the last year or two is really remarkable, and is greatly to the credit of those who have achieved this big task. The way, too, in which the very much awake Ceylon Association protects the Ceylon planters by prosecuting people making fraudulent attempts to pass off blends as *pure* Ceylon tea, and others using misleading names on packets, is an example to the I. T. D. A.

Then the famous "Lipton," who from selling hams, sausages, &c., by the million, has of late become also one of the largest retail vendors of tea in the U. K. has been "got at" by Ceylon enterprise, and he is off out to buy estates in Ceylon. His agency alone will be a stupendous advertisement for Ceylon teas.

SCIENCE AND PRACTICE.—From the proceedings of the American Association of Nurserymen, as reported in "Garden and Forest" we quote an opinion on pruning and pollarding, which seems interesting in its bearing on tea culture and horticulture generally :—

Mr. Thomas Meehan said that it had been fifty years since he wrote his first article for a horticultural paper, and it seemed to him, although horticulture had made rapid advances in all of those years, that it had not progressed as far on the scientific side as it ought to have done. As a practical example of some scientific truths, upon which good practice is based he instanced the fact that fibrous roots live only a year. They do their work and then die. Where there are a hundred small roots now about a young tree there will be in a few years only a few large ones radiating from it, like rail-roads on a map. These big roots alone have the strength to send out fibres, and the root is of no value to the tree until new white fibres are growing. Therefore, it may be that a mass of fibrous roots in a tree for transplanting is injurious. They are weak, they have no vital power to put out rootlets, and they may keep the soil from contact with the big roots, which, therefore, do not find the proper medium in which to throw out feeding roots. Another fact which observation teaches is that roots die in exact proportion to the amount of tops that are cut off. If a tree is pollarded nine-tenths of the roots may die and then invite a fungus which spreads to the living roots. It is said that the branches which sprout from these pollards grow strongly because the roots are stronger below them, but it fact they grow from the food stored up in the trunk, just as shoots three or four feet long often grow out of logs which lie by the wayside. Generally pollarded trees die after this operation has been frequently performed. Look, for example, at an Osage Orange hedge. If one of the trees at the end is allowed to grow it will make a trunk as big as a man's body in twenty years, while the hedge plants of the same age, their vital power being weakened by constant cutting, are no larger than a man's wrist. Of course all pruning is not to be condemned, although it does weaken the vital power of the plant. We prune for other purposes than to make long lived trees.

TRINIDAD HAS ITS "AGRICULTURAL BOARD"—not giving special attention to any one industry or branch of agriculture, but to all. At a meeting of the Colonial Institute Mr. Morris, the Assistant Director at Kew, spoke of the Agricultural Board in the following flattering terms:—"At Trinidad Mr. Fowler has very ably assisted Sir William Robinson in developing industries in that island, and more especially in regard to the work of the Central Board of Agriculture. This Board and its local branches will undoubtedly do much good, not only by directly encouraging industries, but by bringing persons engaged in them into contact with the best markets for the produce in this country and in the United States.

THE NETHERLANDS-INDIA Agricultural Company held its annual meeting on the 8th inst., when the report for 1889 90 was presented, which shows that a good profit has been made. The disease in the leaves of the coffee trees was only observed to a small extent. The crop of the four undertakings amounted to 6,290 piculs of coffee, being about 300 piculs above the estimate, which figure would have been more if a fearful inundation had not destroyed a large quantity on the Sonosehar Estate. The quality of the coffee was very superior, and the prices fetched were high—viz, from c. 55¼. to c. 57¼. According to the profit and loss account there is a net profit of f. 84,704, and a dividend will be paid to shareholders of 15 per cent. or f. 45 per share—*L. and C. Express.*

TENDER FOR THE MYSORE RUBY MINES.—The Dewan of Mysore has, says a Bangalore paper, informed Messrs. Streeter & Co, the great gem merchants of New Bond Street, London, that the Mysore Government cannot entertain any proposal having for its object a monopoly of any particular industry, nor can it grant an exclusive right to prospect for gems for five years in so large an area as a whole taluq. A tender for a square mile or so will be entertained. The Mysore ruby mines are said to be even superior to those of Burma, and Dr. Clarke speaks of specimens shown him from the limestone rocks of Banawar as being "oriental of the purest water and not spinelles."—*Indian Engineer.*

RAILWAY SLEEPERS FOR THE HINDUPUR RAILWAY.—It is stated that the Mysore Government have decided to utilise the forests of Mysore for the supply of teak sleepers for the Hindupur Railway. About 80 miles of this line will be in Mysore territory and the requirements being about 2,000 sleepers per mile, 1,60,000 sleepers will be required. The sleepers are 6 ft. long 8 inches wide and 4 nches deep, or one and a third cubic feet each, nd will cost about R2-4-0. Mr. Lee, son of Mr. Standish Lee, Sanitary Engineer of Mysore, has, it is believed, obtained the contract for preparing the sleepers from the rough logs as delivered by the Mysore Forest Department.—*Indian Engineer.*

ARTIFICIAL TEA.—The Germans are endeavouring to establish a new industry in the production of an article which they call artificial tea. They take the leaves of the wild strawberry plant and add to them the young leaves of bramble and woodruff, and the beverage brewed from the mixture is said to be of nearly the same taste as the tea of India and China. There is nothing artificial about this German tea, but it is a mistake to suppose that it can be produced inexpensively. It will cost quite as much as the imported tea, especially if it should be required in such quantity as would render it necessary to cultivate the herbs required in its fabrication. The cultivation and preparation of tea are not more expensive than the gathering and drying of substituted leaves would be.—"Science Gossip" in Melbourne *Leader.*

THE KOLA NUT, of which a good deal has been said lately, is rapidly increasing in favour as an indispensable adjunct to a traveller's kit. The French Alpine Club has just adopted it as a stimulant and nutrient in their mountain-climbing expeditions. The nut has, it is stated, been found to act most usefully in strengthening a person's "breathing powers" and keeping off muscular fatigue. The German military authorities have, it is said, determined to employ it in the German army. The acting principle of the nut is caffeine.—*Indian Agriculturist.*

THE "AWETO": A VEGETABLE CATERPILLAR.—The *Graphic* of 30th Aug. has the following:—The oddest insect in existence—so odd, that unless it were vouched for and explained scientifically would be considered a hoax—is the Aweto. It is not easy to decide whether it ought to be classed under the fauna or flora of New Zealand, for it is as much vegetable as animal: and, in final stage, it is a vegetable, and nothing else. This is the Vegetable Caterpillar, called by naturalists *Hipialis virescens.* It is a perfect caterpillar; and a fine one also, growing to three and a half inches. Until it is full grown it conducts itself very much like any other insect, except that it is never found anywhere but in the neighbourhood of the Rata tree, a large scarlet-flowered myrtle, and that it habitually buries itself a few inches under ground. Then, when the Aweto is fully grown, it undergoes a wonderful change. For some inexplicable reason, the spore of a vegetable fungus, the *Sphæria Robertsii,* fixes itself directly on its neck, takes root, and grows, like a diminutive bulrush, from six to ten inches high, without leaves, and with a dark-brown bead. This stem penetrates the earth over the caterpillar, and stands up a few inches above the ground. The root grows simultaneously to the body of the caterpillar, which it exactly fills in every part, without altering its form in the slightest degree, but simply substituting a vegetable substance for an animal substance. As soon as this process is completed, both the caterpillar and fungus die, and become dry and hard, but without shrivelling at all. The thing is then a wooden caterpillar, so to say, with a wooden bulrush standing up from its neck. *Papier mâché,* perhaps, would better describe it than wood. It can be taken out of the ground entire, and preserved for any time. Where the Aweto is found, many specimens can be obtained. It is a light green when alive, and the Maoris eat it in its soft state, when it resembles marrow. When dry, they powder it for use as a flesh-dye in tatooing. It is certain that the caterpillar and fungus were made for each other, as the *Hipialis virescens* is never found without *Sphæria Robertsii* growing out of it, and *Sphæria Robertsii* is never found without this caterpillar attached to it.—Our engraving is from a sketch by Major-General Robley, and the specimen is in the possession of Comte L. de Jouffroy d'Abbans, French Consul at Zurich.

Major-General Robley has gained fame lately as a *badineur*; but in this case we do not think that he is "pulling the leg" of the public. A similar fungoid growth is not uncommon in the case of the white grub in Ceylon. In fact, as our entomological referee states:—

This fungoid disease is not confined to the larva of one species of moth alone. I have noticed it occasionally on mole crickets from several localities, and on other insects that reside underground, and which have succumbed to its attack. It must not be supposed from the statement that "the *Hipialis virescens* is never found without *Sphæria Robertsii* coming out of it," that every individual of the species is fated never to reach the perfect state from that cause, for how could reproduction be effected? I send herewith a book in which you will find a description and figure of the fungus.

The figure given in the book sent is of *Torrubia militaris* on the pupa in moth, and is very similar to the one drawn by Major-General Robley.

HILLCOUNTRY PLANTING REPORT.

"THE BATTLE OF THE WATTLES." THE BEST TREES TO GROW FOR FUEL.

I come up here to find the battle of the "wattles" * revived and raging, promising almost to rival "the battle of the gauges." When about three years ago I had the pleasure of visiting Mr. Kellow's fine and fertile estate of Albion, adjoining the reef of limestone so rich in spinel sapphires, below Hakgala, I remember we could scarcely get along the paths which had been cut on the patana from the abundance of the up-springing suckers from the roots of a wattle, which I suppose was *Acacia dealbata*? Now Mr. Kellow cultivates in preference a plant raised from seed he obtained from Australia as that of *A. decurrens*, which grows rapidly into a good-sized tree, but which does not send up suckers from its roots. I am sorry I have not Mr. Kellow's memorandum of a tree of this kind which Mr. Nock has at Hakgala, and which at the age of seven years has attained large dimensions,—60 feet in height and 7 in girth near the root, I believe. † *Acacia decurrens*, especially the variety known as *mollissima*, yields about the finest tanning bark in the world; and although it might not pay us in Ceylon to grow this tree for its bark, yet, in cutting trees down for timber or fuel, the bark might be stripped and saved. The local tanners of hides or those who have made tanning hides a great industry at Madras might give a remunerative price for the bark. I am glad to see the specimen Mr. Kellow has sent, because it enables me to class as identical with it one of two magnificent Australian acacias which we have grown without knowing their names, but merely distinguishing them as the "golden flush" and the "silver flush" wattles. As far as foliage goes the former is the same as Mr. Kellow's, and the other is probably *A. dealbata*, if, as seems to be the case, there is a variety of *A. dealbata* which grows into a large timber tree and does not send up suckers? Our two gigantic wattles have never shown the slightest tendency to this latter habit. Here as in Australia several of the numerous acacias which bear golden-coloured flowers have been indiscriminately called "golden wattles." In Nuwara Eliya this name has been applied to a species which sends up suckers and which has formed such a dense and shady grove near the Church. I am told that Dr. Trimen has identified this tree as a *decurrens*, var. *mollissima* ‡ The true golden wattle, *A pycnantha*, however, is now grown in the forest nurseries in Nuwara Eliya, and has an undivided leaf, instead of the feathery foliage of the "golden wattle" we have been referring to. The true *A. dealbata* is, I suppose, the tree with silvery foliage, to be seen at and beyond Kellow's cottages, and which is specially remarkable for sending up groves of suckers from its roots. We have two "golden wattles" here at Abbotsford, neither of which is *A. pycnantha*. One species we are propagating from seed which the trees have yielded. The foliage and the blossom are equally beautiful, and some of the trees which were cut down yielded excellent firewood, *as I believe all the wattles do.* Of another species we have only one specimen, and it is remarkable from its horizontal and contorted habit of growth. Its leaf is exactly that of *A. pycnantha*, but the blossoms, instead of a series of little mimosa heads along a stalk, are regular catkins, closely resembling those of the willow. This wide-speading tree burst into full blossom recently, and "magnificent" is the only term which can describe the spectacle it presented. There are probably from 200 to 300 acacias in Australia, and a large proportion of them have golden hued and sweet scented blossoms. I can never forget the banks of the Mitchell river in Gippsland, both sides lined as it were with gold. The Australians when they go "a-maying" (in the month of January) carry home branches of golden-blossomed wattles, instead of the hawthorn of "home," which however flourishes exceedingly on the banks of the Derwent, in Tasmania. It may be well to give a notice of the species of acacias, native to Australia, of which we know most in Ceylon.

A. pycnantha, the typical "golden wattle," has been only recently introduced, and except as an ornamental plant it does not seem likely

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* The name is an old English one, and signifies the interlacing of boughs together to form a kind of wicker-work. The aboriginals used them in the construction of their abodes, and the early colonists used to split the stems of slender species into laths for "wattling" the walls of their rude habitations.—*Maiden's Native Plants of Australia.*

† Mr. Nock was good enough to measure his three giant trees in Hakgala Gardens in our presence the other day, with the following result:—

A. decurrens—8½ years old—50 feet high, 7 feet 2 inches in circumference a foot above the ground, and 5 feet 3 inches circum. 5 feet above ground.

Pinus longifolia—14 years old—6 feet 8 inches and 6 feet 4 inches in circumference respectively at 1 and 5 feet above ground.

Cupressus (*? species*)—40 feet high—9 feet and 7½ ft. in circumference at 1 and 5 feet above ground respectively—age not certain.—ED. *T. A.*

‡ On reference, Dr. Trimen is good enough to report as follows:—"So far as my memory goes the acacia in question (near Nuwara Eliya church) is the silver wattle, *A. dealbata*. I do not think that *A decurrens* or its variety *mollis* (= *A. mollissima*) sends up suckers from the roots. The three sorts can be readily recognized by the young twigs of unopened foliage. In *A. dealbata* ("silver wattle") these are white and silvery; in *A. mollissima* ("black wattle" or "green wattle" in Australia, but often "golden wattle" in Ceylon) they are golden yellow; and in *A. decurrens* (also black or green wattle) they have but little silkiness and are merely pale green. *A. dealbata* rarely opens its flowers here and seems to be always in bud. *A. mollissima* has pale sulphur yellow blossoms succeeded by pods constricted between the seeds. Of true *A. decurrens* there does not seem to be much in Nuwara Eliya and its neighbourhood." There is no doubt, we believe, that Mr. A. J. Kellow has now on *Upper* Albion a fine grove of the true *A. decurrens* (the same tree as Mr. Nock's giant in the Hakgala Gardens) cultivated on patana land; and the growth made in three years is so great that already Mr. Kellow has been able to cut down trees for the posts and rafters of some lines he is building. His chief object in planting this acacia was a windbelt, for which the tree has proved itself admirably adapted. The grove runs straight up hill, and it has become so conspicuous as to be a landmark seen from the side of Namunakulakanda or the neighbourhood of Badulla, as Mr. Nock was able to tell us. We must mention one other fact: we received at Naseby some seed from Messrs. J. P. William & Bros. of Henaratgoda, and one packet marked *A. decurrens* was identical with seed received the same day from the manager of Abbotsford (given as a wattle that did not throw up suckers), and both packets were, we believe, recognized by Messrs. Nock and Kellow as of the right acacia (*decurrens*). Still, it may not be safe to trust to seed, and now that Dr. Trimen has given a ready means of recognising the three wattles so apt to be confounded, there ought to be less doubt as to their identity in the future. It is just possible that Mr. Kellow's trees, the Abbotsford and Henaratgoda seed may belong to *A. decurrens* var. *mollissima*, as it again throws up no shoots?—ED. *T. A.*

to be of much value to us. According to Baron Von Mueller, it is next to *A. decurrens* for tanning bark, but the tree does not seem to grow more than 30 feet high. In our climate, however, this and other Australian trees are likely to grow more luxuriantly than in their native habitat. The wood of this tree, though small, is well adapted for staves, handles of implements, articles of turnery, especially bobbins. [N. B.—The Colombo Spinning and Weaving Company.] Maiden describes it as the golden, green or broad-leaved wattle, the bark rich in tannin and gum and the flowers in perfume. Osborne described the wood as tough and close grained.

A. decurrens Von Mueller describes as a small or middle-sized tree. Its wood is used for staves, turner's work, axe and pick handles and many other purposes. The Baron adds what is of special importance to our planting community, that it is an *excellent firewood*. He also states that it is a good first shelter for treeless localities [our patanas] for raising forest. [Officers of the Forest Department to note.] "The typical *A. decurrens* with large leaflets [?], occurs particularly in New South Wales and is seldom above 30 feet high." But he adds a mention of trees 60 feet high, so that there must be distinct varieties, or, as is probable, the soil and climate of different localities give very different results, the tree is easily propagated and grows rapidly. It is content with the poorest soil, though it makes better growth in better soil. Cultivation easy, broadcast or in rows. Seeds can be obtained in Melbourne at about 5s per lb., each pound consisting of 30 0 0 0 to 50 000 grains. The seed ought to be soaked in warm water before being sown. Von Mueller adds "Hardier than *E. globulus*, although, unlike *A. dealbata*, it hardly extends to sub-alpine elevations." He means, of course, in Australia, where 2,000 feet, except in tropical Queensland and South Australia, may be the equivalent of 5,000 or 6,000 in Ceylon. Maiden gives the names, "black wattle," *from the colour of the bark*; "green" and "feathery" wattle.* The timber is light tough and strong but he adds that it is generally much bored by the larvæ of coleopterous insects. [We have not seen or heard of this occurring in Ceylon.] But the next quality attributed to this tree shows that it is just what is wanted to be cultivated in factory fuel groves. "EVEN IN A GREEN STATE IT FURNISHES EXCELLENT FUEL. *Yields over 26 per cent charcoal.* Wood easy to work. The sap wood is white, while the heart is of a pinkish colour. Slabs in the Technical Museum at Sydney were 12 to 18 inches diameter. But it is not timber we want so much on tea estates,—while the supply of tea boxes comes to us from Japan and other sources, as fuel, and especially fuel which will burn as this wood does when green.

And now of *A. decurrens*, var. *mollissima*, which we hope is really the golden-blossomed species near the church and in other places in Nuwara Eliya, Von Mueller states that all he wrote about *A. decurrens* applied to this variety; while Maiden says that the timber is light, tough and strong; used for staves for beef and water casks in Tasmania. It is subject to attacks by insects. [Not here, so far as we know.] A tree 2 feet diameter of this species was tested in Victoria and gave an average specific breaking strength of 2 063 lb. Not a word is said by Von Mueller or Maiden about *A. decurrens* sending up suckers; and Mr. Kellow's trees and ours do not; but we suspect that in both cases we have a departure from type? The golden-blossomed wattle in Nuwara Eliya certainly sends up suckers as readily as does the so-called silver wattle, *A dealbata*; and we do not think it advisable to grow *any* of the wattles amongst the tea, but only in ground devoted to them and to other trees. A large proportion of the Australian trees have a tendency to throw up suckers, and this tendency has been strongly developed with us by a favourite species of casuarina, which grows tall and straight and generally one-stemmed, the very reverse of the habit of our prevalent casuarina, which grows comparatively short, with dense foliage and numerous crooked branches. Many trees of this kind are inclined to die off at 7 to 10 years of age, but we have arrested this tendency by pruning; and even the trees which go off yield good firewood, *as do all the casuarinas, their ashes retaining heat for a prolonged period.* No more valuable trees can be cultivated by planters; but, as in the case of the acacias, not amongst the tea. The bushy *casuarina* seldom throws up suckers, but the enormous quantity of spines it drops is very adverse to other vegetation. The beautiful tall casuarina is objectionable amongst tea, though not equally harmful, by reason of its wonderfully profuse subsidiary plants in the shape of suckers. One tree near our bungalow has extended its roots full thirty yards around its stem, and all along they can be traced by fine young plants springing up from them, which, like those of *A. melanoxylon*, we are transplanting into pieces of ground where they can "increase and multiply" at their will. If as I think, our graceful, tall and slim casuarina, which shows no tendency to "insidious defunction," is *C torulosa* (syn. *C. tenuissima*), it is "*one of the best woods for oven fuel,*" while of *C. stricta* the record is, "*As fuel it can hardly be excelled.*" Your readers are aware that on the sandy seashore near Madras large plantations were formed for fuel supply to the railways of *C. equisetifolia*, the large and beautiful tree so common in Colombo, and of which a remarkable avenue, planted by the late Mr. W. Ferguson, runs for a long distance from the new Lunatic Asylum. My apology for thus digressing to a notice of the casuarina (she-oaks and beef-wood trees of Australia) is that no better, at any rate few better, trees can be grown by planters and others for firewood than those trees and the "wattles." Of these I have now to notice the much despised and in Ootacamund execrated

A. dealbata, which, according to Von Mueller is a still better tree for the purpose we have mentioned than even *A. decurrens*. It is known to colonists as "silver wattle," "Prefers humid river banks, where it *sometimes* attains 150 feet, yielding tough timber, used by coopers and other artizans, but principally serving as

SELECT FUEL OF GREAT HEATING POWER.

This tree is distinguished from the black wattle, by the silvery or rather ashy hue of its young foliage." Maiden states that *A. dealbata* is called silver wattle, from *the whiteness of the trunk* as well as the silvery or ashy hue of the young foliage. It is evident that this is the terrible spreader by suckers which has been denounced as a nuisance at Ootacamund, because it was allowed to grow everywhere unchecked until it monopolized the ground and afforded cover which was abused with insanitary results. There is an extract from the *Madras Mail* about the desperate war with the plant which had invaded garden and grassland alike. "The myriads of suckers which spring from the extensive and encroaching wattles come up with renewed vigour and amazing rapidity as fast as they are cut down, and form an *inexhaustible fuel reserve.*" Surely that is what

* The *broad-leaved*, typical species can scarcely be feathery?

planters want, even if, as Col Beddome writes, the tree can be depended on only for small firewood. He means from the suckers, no doubt, as the tree grows large and probably the larger, original trees and those derived from them can be successfully coppiced. Even small firewood of good caloric properties will be useful for tea furnaces. Besides the two wattles I have noticed,—*A. decurrens* and *A. dealbata.* to wit.—

A. melanoxylon has been well established in Ceylon, and fine, large pyramidal trees of this wattle are amongst the ornaments of Nuwara Eliya. Many of them are infested by the loranthus parasite,* but a cooly with a sickle or knife at the end of a long pole could easily free these grand trees of their enemies. In cultivated ground, these trees while growing well themselves, send up numerous suckers which speedily rival them in growth. This, which is reckoned their best wood in Australia, equivalent to walnut or ebony, is not so favourably spoken of on the Nilgiris, where it is said to be slow of growth, which it certainly is not here. Even if the timber should, in this forcing tropical climate, not be equal to what the tree yields in Australia, what we mainly want are quick-growing trees, to supply fuel for factory and railway engine furnaces and like purposes

There are others of the Australian acacias which might well be grown in Ceylon, such as *A. acuminata the best of the West Australian woods for charcoal,—good* fence posts—fine ornamental timber, —dark reddish brown, close-grained hard wood;

A. Cunninghami, like red cedar but heavier;

A. excelsa—beautiful cabinet wood with odour of violets.

A. stenophylla, called ironwood on account of its hard heavy timber: close grained, dark, beautifully marked and takes a fine polish. It planes excellently, showing a smooth surface. Diameter 15 to 24 inches, height 40 to 60 feet.

Of the Eucalypts the blue gum yields a fairly good fuel and it coppices splendidly. Where the original trees looked thin and scraggy, the numerous coppice shoots look exceedingly fresh and flourishing. Mr J. L. Anstruther some time ago communicated to the *Observer* a very interesting account of his successful coppicing experiment with blue gums. "Mr. Gass found in the Newman plantation, then 5 to 6 years old, an amount of material equal to 152 tons per acre, and Col. Beddome is of opinion that the best treatment of Eucalyptus plantations, so as to get the greatest profit, will be to cut for coppice every five or six years, obtaining at the cuttings at least 100 tons per acre." GAMBLE, *Manual of Indian Timbers.*

The red gum would yield excellent fuel, were it not too good for such a purpose So with jarrah and others of the family. The eucalypts we find specially mentioned as good for fuel are:—*E. goniocalyx*, "when not used for better purposes it is sought for fuel;" *E. sideroxylon*: "It is one of the best fuel wood of New South Wales for domestic uses and steam engines;" *E. longifolia*, "This wood is in request for fuel;" *E. macrorrhyncha*, "furnishes a fair fuel;" *E pauciflora*, "excellent for fuel;" *E. punctata*, "affords a superior fuel;" *E. siberiana*, "burns well even when fresh." "It is generally considered a firstrate firewood, by some even the very best; in fact the choice lies here between it and *A. stellulata*." It will thus be seen that amongst the acacias, casuarinas and eucalypts of Australia, most of which flourish as well, in some cases better, in Ceylon than in the country to which they are native, are many good fuel-yielders, such are now wanted for cultivation on or in connection with tea estates.

* Our Ceylon substitute for the misletoe.

[It may be of interest to add the summary of the different "Wattles," given in the "Treasury of Botany":—

Wattle. An Australian colonial name applied to various species of Acacia. —, Black, Acacia decurrens; also A. mollissima. —, Green, Acacia decurrens. —, Raspberry-Jam, Acacia acuminata. —, Savannah, Citharexylon quadrangulare and C. cinereum. —, Scrub, Acacia stipuligera. —, Silver. Acacia mollissima. —, —, of Tasmania, Acacia dealbata.

The following paragraph from a Brisbane paper is worth reproducing: the questions were put at the instance of Mr. Kellow. They show among other things that his *A. decurrens* grew 12 feet within the first year:—

"THE WATTLE—H. W. K. (Cooktown, Q): Would you kindly give me through the medium of your valuable journal the following particulars relative to wattle culture: 1, age of tree before cutting; 2, average of bark per tree; 3, mode of harvesting; 4, whether shipped to England or used locally; 5, average rate per ton; 6, would 12 feet in height for Acacia decurrens, under 12 months, be considered good growth for trees raised from seed? Any other information regarding this valuable product would be thankfully received.—*Answers*:—1, from 5 to 10 years; 2, about 1 cwt, though from gigantic trees as much as ½ a ton has been collected; 3, stripping in the ordinary way; 4, both; 5 in the Colonies about £5 per ton, in England it ranges from £8 to £11 per ton; 6, yes. Wattle seed can be sown broadcast, and the tree flourishes on the poorest of soils. The bark contains about 50 per cent of tannin. A ton of bark is said to be sufficient to tan twenty-five hides."—ED. *T. A.*]

ANOTHER BRIGHT BLOSSOMED JUNGLE PLANT —THE GOLDEN WATTLE—FINE GROWING WEATHER—*pinus sinensis*—THE PROCESS OF TEA MANUFACTURE—THE ROLL-BREAKER—BULKING: A MACHINE WANTED—NO HOLIDAY FOR CEYLON TEA PLANTERS—CROAKING PROPHECIES FALSIFIED—INSECT ENEMIES—THE NORTH-EAST MONSOON AT HAND—DELAY IN THE RAILWAY EXTENSION WORK.

NANUOYA, Oct. 7th.

Respecting a second plant, brilliant with white blossoms and abounding in the forests of this region, up to the mountain sides above Nuwara Eliya, in association with the one previously noticed,—Dr. Trimen has been good enough to give the following account:—

"Your plant is another *Hedyotis*—there are a great many of them—*H. Lesseritana.* It has but little of the beauty of its congener, though a stately plant when well grown in damp forests. There is a very large form of it in the highest elevations which might almost be called a tree.

"My memory of the Acacia by the church at Nuwara Eliya does not quite serve me, but I think it is rather *A. dealbata.* Neither *A. decurrens* nor *A. mollissima* I think send up a crop of suckers. I have sent a line as you suggested to the *Observer* Office."

I suspected erroneous information respecting "the golden wattle" so prevalent and so beautiful in Nuwara Eliya. I was struck by the silence of Baron Von Mueller and Professor Maiden, as to any tendency in *A. decurrens* to send up suckers. But if the two trees in Nuwara Eliya which send up suckers so freely are both *A. dealbata*, then its varieties are very distinct. The one which forms the remarkable grove near the church is clean-stemmed, with very handsome, warm-tinted foliage. The other with silvery or ashen-coloured foliage is by no means so handsome a tree. The comparative value of the timbers for fuel purposes is another question.

NANUOYA, Oct. 8th.

I have been considerably disappointed to find so little information available respecting the beautiful

foliaged *Pinus sinensis* which I mentioned as having been obtained from Hakgala and as growing luxuriantly near the Bund of the Nuwara Eliya Lake. Fortune, in his book on the tea districts of India, notices its occurrence without describing it. Gamble does not mention it in his Manual, so that it does not seem to be amongst the foreign plants established in India. Still more strange is it, that neither in Lindley's Vegetable Kingdom nor in the Treasury of Botany is it mentioned. By the name which indicates the tree as specially indigenous to China, I have failed also to find it in that valuable and comprehensive book, Baron von Mueller's "Select Extra Tropical Plants." But I suppose it really is the tree there given as *Pinus Massoniana* (Lambert), which is referred to China and of which it is said that it is "a good sized pine, with widely spreading ramifications. The wood is durable, and when well seasoned, is much employed as material for tea boxes." The Baron adds:—"Professor C. Koch regards *P. Sinensis* (Lambert) as a distinct species." Whether identical with *P. massoniana* or not, *P. sinensis* must certainly be a valuable tree, for it is of this species that Mr. Ford, the Botanist and Forester of Hongkong, has planted out hundreds of thousands in the process of afforesting the British-owned island on the borders of China. Perhaps Dr. Trimen may possess and be ready to impart more definite information regarding *P. sinensis* and its utility as a timber tree to be cultivated on the mountains of Ceylon. Of the exceeding beauty of its foliage there can be no possible question: provided the specimens I obtained from Hakgala were, as I suppose they must have been, correctly identified as the Chinese fir.

From a tree which is associated with the tea plant in China and which yields timber suitable for tea chests, the transition to tea is easy. In the large and well appointed factory here, this morning, I witnessed every process connected with the manufacture of the fragrant leaf, including sizing of the green leaves, withering, rolling, breaking the roll, re-rolling, "fermenting," roasting and binning,—with the bulking and final firing and packing into lead-lined and hermetically closed boxes of tea accumulated in the bins, while still hot from the final firing. For roasting or drying the tea, we have a Davidson's Sirocco, a Jackson's original Drier and a Jackson's Venetian. When we require an additional tea drier, as it seems probable we soon will, we are strongly advised by those whose judgment is worthy of respect to supply the factory with a Brown's Desiccator. What was new to me this morning was the process of breaking up "the roll" by means of a noisy but effective machine manufactured by Walker & Greig. With the attendance of one man it does the work which formerly required the manual labour of four coolies. It has also removed so much necessity for handling the moist leaf, of which no doubt the less the better. For the benefit of the uninitiated I may say that the green leaf, after undergoing a withering process, prolonged or shortened according to the prevalent weather, is rolled by a machine which beautifully imitates while it has happily superseded the motion of multitudinous human hands. In this process the juice expressed in the squeezing and twisting of the leaves causes masses of them to adhere,—masses which, previously to the introduction of the roll-breaker, had to be separated by the human hand, preparatory to being fermented, or, as is now the practice, to a second rolling before the leaf is finally broken up and left to be fermented or rather oxygenized, for true fermentation would mean destruction of the leaf or at any rate of all the properties which make the leaf pleasant and profitable. The second process which specially interested me was that of "bulking" the tea. This is still done here by human agency; and although the handling by the coolies of the dried leaves, which are subsequently submitted to the effects of a final firing, may not be objectionable, yet I can quite conceive of a bulking machine which, while mixing the leaves effectually, would be appreciably labour-saving. The "bulking" of the leaf means such a mixing together of teas made day by day and stored in metal-lined and closely shutting bins, for a week, a fortnight, or a month as the case may be, as will secure a uniform quality throughout, so that, if a sample of one chest is tasted, that sample will fairly represent the contents of the whole of the boxes of the particular description of tea,—broken or orange pekoe, pekoe, or pekoe souchong, our three staple grades in Ceylon. I saw a pyramidal heap of the latter quality operated on this morning. It rested on cloth spread on the floor considerably beyond the base of the heap of tea. At a signal, the dozen of coolies who surrounded the heap drew the tea with their hands onwards on the cloth until a vacant space was left in the centre. Into and over this space the tea was then thrown back, until the pyramid was restored. Then the pulling down and the building up processes were repeated, so that the whole of the daily makings of tea were thoroughly amalgamated. If this process is always as carefully carried on as it was this morning, I cannot understand why our invoices are not invariably accepted as "factory bulked," instead of an exception being occasionally made, as recently, "all except the pekoe souchong," which 'of course' had to be subjected to the damaging effects of being turned out of the boxes on the perhaps damp floor of a London warehouse and repacked into packages the lead of which was probably torn and some of the wood broken. We are inclined to think that London objections to the bulking here are often capricious, but, of course, the varied moods of coolies differ from the uniform action of material machinery; and it seems to me that a really good bulking machine would be a useful addition to our factory appliances. I have never seen such a machine, but I have been told of one which somewhat resembles an hour-glass, the leaf being inserted in an orifice at the top and being spread out as it descends. Perhaps a correspondent of the *Observer* will describe a bulking machine in use and its action,—whether quite effective while appreciably labour-saving. There is one operation of which I have omitted to mention, although I witnessed it this morning, and which unreasoning machinery can never effect. That is the picking out of "red leaf," stalks, bits of coir and other foreign substances from the roasted tea, in which necessary although slow and expensive work women are chiefly employed. By the recommendation of a competent authority the tea cutter has recently been superseded by a process of breaking in which also hand labour is employed. The whole of the processes of tea manufacture, much of which consists of chemical action, are complicated and exceedingly nice in their nature, and require intelligent and constant, and I may add unremitting, attention from year's end to year's end, forming a complete contrast to the pulping, washing and partial drying of coffee, crowded into a few months of the year and leaving room for a holiday or comparatively easy work during the remaining months. We in Ceylon have not even the winter during which tea is inert and planter active in hunting, visiting or holiday-making in India and Assam. It is curious, now that Ceylon tea has obtained so high a place in the world's esteem, to recall the prognostications of Assam

planters that tea could never be a success in an island so near the equator, without a winter and with the rainfall distributed over so large a proportion of the year. There never was a case perhaps where preconceived ideas and the traditions of an enterprise were so falsified by actual results. The immunity of our tea from insect and fungus pests is also remarkable. The grubs, brown and white, which were so fatal to coffee in its young and mature stages, find nothing attractive in tea bushes. We could wish they were equally indifferent to nurseries of timber trees and greensward. For small patches of the latter which have been attempted here, the white grubs have a most annoying predilection: what is one day emerald green becoming brown tomorrow, as if sun-withered, although copious rain continues to fall. The number of cockchafer beetles we ever see, seem in entirely inadequate proportion to the prevalence of white grubs. But the latter spend three years underground eating the feeding rootlets of such plants as are acceptable to them before they develope into the winged stage. Even the moths which have been pretty abundant lately are innocuous as far as tea is concerned. For several years now the species which lays its eggs in young flush, the young leaves curling up and withering, has been absent, or if present has altered its habit. There is neither helopeltis nor green fly, red rust nor scale insect to meddle with flush which is so plentiful that work in the factory had to be carried on until ½ past 2 this morning. I speak, of course, of estates within my purview, while I have *heard* of one estate and one only where the prevalence of scale insect necessitated the cutting down of some acres of tea. Tree planting ought to be carried out, however, not merely for a supply of fuel, but to interrupt that continuity of one product in widespread expanses, which seems to invite the visitations, such as have proved so injurious to potatoes, and in Ceylon so fatal to coffee. At high elevations, too, the shelter of trees seems beneficial to tea, while their shade does not seem injurious. In Japan, as we have lately read, they shade tea to increase the proportion of theine in the leaf.

THE TROPICAL SUN—THE TEA PLANTER'S ENEMY—CINCHONA FLOURISHING—UBIQUITOUS TEA—ROSES AT HAKGALA—THE SOURCE OF THE MAHAWELIGANGA—GROWTH OF TOONS AND CRYPTOMERIAS—TREES IN NUWARA ELIYA—CURIOUS ACACIAS—A FINE BLUE GUM—ATTRACTIONS OF THE SANATORIUM—THE WILD FLOWERS OF THE CEYLON HILL COUNTRY—PAUCITY OF PLANTS INDIGENOUS TO INDIA AND CEYLON.

NANUOYA, Oct. 7th.

After the morning mists had cleared away, yesterday was, here and at Nuwara Eliya, a glorious sunny day. Indeed the sun during noon and forenoon allowed of no mistake as to our being in the tropics, even when standing on one of the knolls in the Sanatorium at an elevation of 6,400 feet. At the meeting in "The Town Hall" between 3 and 4 p.m., the temperature was oppressive, due I suppose to the heating of the iron roof. In passing through the Inverness forest, *en route*, we were struck by the beautiful white inflorescence, contrasted with the large, deep green glabrous leaves of a tree, which turned out to be the *symplocos* so fatal in tea plantations from a fungus which forms on its decaying roots. But still more remarkable was the profuse and beautiful flowering of fine *Cinchona robusta* trees, of which there are still so many on Inverness estate. Apart from the value of this hardy hybrid, few plants can be more ornamental, the prevailing tint of the flowers being a rich orange-red. If the cultivation of cinchona is to be continued in Ceylon, this is certainly the kind to plant; and if seed is, as it is likely to be, in proportion to flower, Messrs. Cross and Ballardie will be able to supply a very large demand. Meantime I have to report ledgerianas as flourishing at 5,700 feet elevation, where at the commencement of the enterprise they had to be coaxed into growing. Is this valuable species adapting itself to our higher elevations? Inverness, like Mariawatte, shows what a plentiful application of manure can do for tea. In these high altitudes, as might be expected, the young tea plants are longer in "coming away," and the older plants require two or three more years in coming to maturity than in the medium elevations or in "the lowcountry"; but the tea which runs up the side of "One Tree Hill" to the verge of 7,000 feet, shows that the plant with this qualification is at home at nearly our highest as well as our lowest elevations above sea-level—responding fully everywhere to high cultivation and fertilizers. At Nuwara Eliya we met Mr. Nock of the Hakgala Gardens and we were sorry we could not go down to enjoy the spectacle which he described to us: 5,000 blooms on his collection of rose bushes, of which 675 were counted on one bush of "Lamarck." We had our day's work cut out for us in examining the progress of the *Cedrela toona* and other trees on a ten-acre lot of land near "the Bund," where the waters of "the Mahaweliganga," as the river which forms the lake is called in the Nuwara Eliya titledeeds, are thrown back to form a lake. But the Agraoya which rises on Kirigalpotta is really the main source of the great sand river. We found the toons, with their red-coloured heads of foliage, looking really grand in their luxuriant growth and in their complete and striking contrast to the other vegetation around, native jungle or introduced plants. The toons and the cryptomerias (*C. japonica*) which are interspersed amongst them were planted out in Sept. 1886, so that they are now just four years old. We measured a toon, one amongst the tallest, which turned out to be 40 feet high and 16 inches in girth a foot above the ground. The rate of growth, therefore, was 10 feet per annum upwards and 4 inches in girth at the lower portion. Considering the rapid skyward growth the girth is satisfactory, and a few years hence, judging by our 11 years old trees, the Bund toons will devote their energies to the thickening of their branchless trunks. The average growth of the toons in the four years may probably be taken at 34 feet. The cryptomerias have made as nearly as possible half the vertical growth, but a lateral growth more in proportion than the toons, besides covering their trunks with a series of branches from the very roots. One of the tallest cryptomerias which we measured was 19½ feet high with 10½ inches girth. Some Australian eucalypts planted in our grove only lately will soon overtop even the toons. Amongst ornamental trees obtained from Hakgala, prominent for beautiful and luxuriant growth is *Pinus sinensis*. For ornamental purposes it cannot be surpassed even by *Pinus longifolia*. The only question is, as regards economic use, whether its tendency to go off into numerous stems cannot be corrected. Some of the wattles in Nuwara Eliya were in beautiful blossom, but for rich, deep golden bloom the furze or gorse or whins, near Bellwood,—truly a sight of glory,—far excelled the acacias. Pity it is "the lang yellow broom" is not equally successful. New species of Australian acacias have been planted out on the Plain, and the time seems to have arrived when all should be identified and described for the benefit of planters in search of the best firewood plants. The grevillea, which grows so well at

elevations below Nuwara Eliya, is more a timber than a firewood tree, and so, perhaps, is *Acacia melanoxylon*, respecting which observation during yesterday's visit has puzzled us. The old typical, dark-foliaged pyramidal trees have never, to our knowledge, flowered or seeded. But yesterday we saw a tree at the Post Office, with *melanoxylon* foliage but of umbrageous habit in full flower. Not only so, but quite young trees which looked like *A. melanoxylon* had flowers on them, and we were told that a gentleman in Maturata was selling seeds of *A. melanoxylon.* We want "more light" about these curious acacias. We have measured the girth of one of the grand blue gums at the Grand Hotel, and found it to be, at 1½ foot above the ground, 9 feet 6 inches. Its height we did not ascertain, but it probably ranged above 100 feet. There are other fine gums in Nuwara Eliya. The sunny weather had brought out the north-east monsoon butterflies as well as the flowers, and every feature of the Pidurutalagala ranges, as well as the three peaks of the grand isolated mass of Hakgala, was revealed in the clear sunlight, in which mountains, plains, lake and river were bathed. The balsams, osbeckias (purple and pink), St. John's wort, pink orchids and the white flowers recently noticed, with many others, were in beautiful bloom. The Forest Department have planted part of the vacant space below Nuwara Eliya with cryptomerias, frenclas, &c. When all is planted and grown, a new attraction will be added to the grand drive from the Nanuoya terminus to the mountain sanatorium. But "tappal time" warns me to stop.

NANUOYA, Oct. 8th.

When writing this morning about one of our most beautiful wild flowers, the pure white of which contrasts so strikingly with the bright red of adjacent osbeckias, I forgot to mention what I heard with interest from Nuwara Eliya. A lady resident there, distinguished for literary talent and good taste, has commenced the aggregation of all our wild flowers in a garden specially devoted to the purpose It may convey to some a new idea of the wealth of our upland regions—especially our grassy prairies—in indigenous flowers, when I add that already the collection has reached 150 different specimens. Mr. Nock is giving his valuable and cordial aid to the design, and he will, of course, see that foreign plants long naturalized and recent escapes from gardens and estates are either not included or distinguished by being planted separately or otherwise indicated. When one enters on the investigation, it is startling to find how few plants—economic products especially—are native to India and Ceylon: how much both owe to other countries, especially to the western world. We suppose the plantain is indigenous, and so, perhaps, is the coconut palm,* but is it patent to the bulk of your readers that the pineapple and some varieties, at least, of the custard-apple came to us from America, with the tobacco plant and the red peppers we call chillies, as well as the sensitive plant, passion-flowers, &c. The orange, Bonavia seems to think, came from the Eastern Archipelago and China, although it appears to have existed in Mesopotamia in far back antiquity.

THE AGRI-HORTICULTURAL SHOW IN NUWARA ELIYA.

And this mention of plants and flowers reminds me of a circular which has been issued by the Assistant Government Agent of Nuwara Eliya summoning a meeting at 3 p. m. on Monday next to consider a proposal which has been made for an Agri-Horticultural and General Show at the Sanatorium at the Easter season, similar to the one held in 1888. If there is fair evidence available that such a Show is likely to be well supported, especially by native exhibitors, whose interests it is desired above all others to further by such exhibitions, I suppose the decision will be in the affirmative. On such occasions the various classes of our population are brought together to exchange amenities as well as to compare notes, and the results cannot but be beneficial. I hope it may be possible to conjoin with the Show a Bazaar in favour of the funds of the Tamil Cooly Mission. No doubt our new ruler will patronize the shew if held, giving it éclat by the presence of himself and family. [The resolution to hold a Show has since been announced.—ED. *T. A.*]

October 9th.

The temperature yesterday morning, with a mist-laden breeze from the south-west which tasted of the north-east, was lower than we have had it since the 25th of last month. But as the day advanced there was a clearing up, and the day continued fine with short showers occasionally. But it rained copiously during the night, and we have rain and some wind this morning, though not accompanied by the cold of yesterday morning. Those who have planting to do will rejoice in the rain, which is, after all, seasonable, as a prelude of the more copious deposits which the now near at hand north-east monsoon will bring. The weather will, however, if it continues wet, hinder progress on the railway; and this remind me that the process of laying down the permanent way on the lower portion of the line may be somewhat delayed until the short-length rails, required for the numerous curves, are separated from those of standard size for the straight portions. To persons who do not recognize the necessity of "super-elevation," in the rounding of curves by trains, the difference of level between the two ends of small culverts across the surface of the line on curves seems very strange.—The rainfall for the 24 hours has been 1·30 inch.

EXTRACT OF EUCALYPTUS LEAVES FOR SCALE IN BOILERS—FINE WEATHER AGAIN.

NANUOYA, Oct. 11th.

While discussing trees which are beyond question not indigenous in Ceylon, although they have made themselves quite at home in our hill and mountain regions, it is interesting generally, and ought to be especially so to the officers of our railway department, the owners of engineering works and all who use steam boilers, that in India a liquor from the leaves of the Australian *Eucalypts* has been found very useful in removing scale. Any quantity of the leaves can be had in most of the planting districts of Ceylon for the asking. In a report on the Lucknow Horticultural Garden, it is stated that

With regard to the use of the extract obtained from eucalyptus leaves for cleaning locomotive boilers, Mr. A. E. Ryles, the Locomotive and Carriage Superintendent of the Bengal and North-Western Railway, after a year's trial, pronounces it to be a ready first-rate disincrustator. He obtains 1,000 gallons of strong fluid from a maund of leaves, and finds that from 8 to 12 gallons of it enables a locomotive to run 1,000 miles without it being necessary to wash the boiler out. To experimenters it may be useful to know that when first used on a dirty boiler, the incrustation does not

* The original home of the coconut palm is supposed to be in the Eastern Archipelago—the nuts floating to the Matara coast of Ceylon? [and so eventually giving rise to the tradition of the Kusta Rajah?] Cinnamon has perhaps a greater claim to be considered indigenous than our leading palm?—ED. *T. A.*

begin to movet ill from three to six weeks, and it takes about six months to remove all the scale. Though slow, it appears to be certain, and should be perserved with. In a communication from the railway officer indicated we find it stated that

The leaves are at present purchased from the Horticultural Gardens, Lucknow, though at most two years hence we will have our own supply from young plants bought from the above gardens or raised in Gorakhpur from seed.

The advertised patent fluid, called the extract of "Eucalyptus Globulus" is sold at R3-8 per gallon in Bombay. We got plants of the Eucalyptus globulus, rostrata and resinifera. The whole of the first died but the other two are growing vigorously, and I do not find that there is any more strength in the liquid from the globulus than from the others, so our supply is certain.

We extract 1,000 gallons of strong liquor from one maund of leaves, which cost us in Gorakhpur R2-8 with R5 for fuel, and cost of labour *nil*;—total one and a half pie per gallon.

We put into a dirty boiler 12 gallons of liquor and repeat it after each trip of from 300 to 450 miles. The action begins after the first trip, and takes the scales clean off the copper box in a month, and is during this time acting more slowly in softening and loosening scale from the iron shell, and still more slowly from the brass tubes.

From my present knowledge of this fluid, I think it will take no less than six months to remove all the objectionable scale from a boiler at a cost of R5 a d R3 per half-year per boiler afterwards.

Th saving in coal sh u d be many times the above, not to men ion the saving we expect in repairs to boilers, as also i i washing out water, as I find we can run from 1,000 to 1 200 miles without a wash-out, and without priming. Our old system was to wash-out after every 300 to 400 miles, and then often have to blow off half a glass of water on account of priming before the run was complete.

The scale comes of both softened and in large pieces, and in great quantities, as you have seen. When first it is put into dirty boilers, great care is needed to see the water spaces do not become solid, as the scale will block them if allowed to remain too long without a wash-out.

Altogether, the results so far are very satisfactory, and I will dully report the internal appearance of the first boiler I have occasion to examine as to whether pitting has ceased or not.

The maund mentioned is, we presume, the maund of 80 lb.. and from this quantity of leaves, it will be seen, no less than 1,000 gallons of strong liquor (strongly acidulous, we presume ?) can be obtained. This seems a most important use to which the gum tree leaves, rich in an essential oil, valuable for many other purposes,—including the treatment of diphtheria,—can be put, and we cannot doubt that local experiments after the Indian example will be instituted. The uses of the Australian trees are many and varied. For instance the pine-like foliage of the casuarinas is not only a good fodder for animals, but, as we have learned recently from Madras, a substitute for mulberry leaves in the feeding of silkworms.

Oct. 12th.

After a pretty strong blow of wind from the *north-west* last evening, there is a lull this morning; and it looks as if we were to have another interval of fine weather before the north-east monsoon puts itself in evidence. The rainfall for the 24 hours has been 30 cents, so that in four days we have had nearly 2 inchhees, actual quantity measured being 2·95 inches.

THE SAP OF TREES.

79, Mark Lane, London, E.C., Sept 26th, 1890.

Gentlemen,—I send you a short review of an interesting new work which is attracting considerable otice in scientific circles. The author certainly seems to have made out a strong case in favour of the Sap descending instead of rising—and it follows that if the leaves perform such important functions in obtaining plant food, it can scarcely be wise or economical to prune heavily as is the custom now on certain Tea plantations in Ceylon. Yours faithfully;

JOHN HUGHES.

A keen observer and ingenious experimentalist, has been writing a book on " Sap: D es it Raise from the Roots ? " a question which he proceeds to answer with a decided negative. To those who merely " run and read," the whole question and answer may appear as a very slight matter indeed. In reality, however, the right answer to the question is of great moment to us all. In the first place, a negative reply simply means the ruthless upsetting of all our preconceived ideas, the reversal of what has been taught in schools for ages.

It is true that, if we examine into the thoory of plant growth as set down by botanical and biological authorities, we find that they disagree among each other to an astonishing degree. They all, however, join in declaring that trees and plants derive sap from their roots, and breathe in gases by their leaves. How the sap rises, whether by capillary attraction, endosmose, root-pressure, suction, or evaporation, or a combination of all (described by Professor Huxley as pulling, pushing, and pumping), the greatest biologists, including Herbert Spencer, Sachs, Huxley Darwin, and others, have by no means been able to decide or prove. They all, nevertheless endorse the theory of rising sap, and agree moreover that it rises in spring and decends in summer. Now, if all this the rising is proved to be wrong, we shal not only have to alter our school teaching, but largely modify our agricu tural practice. Clearly if the roots suck up the soil will quickly become exhausted and require constant feeding, while the leafy parts of the plants must be cut and pruned down. This is the present practice. And it is certainly worthy of remark that our best cultivated—according to the theories of the day—orchards and gardens are those that suffer most readily from blight and disease generally. Our new botanical revolutionist, Mr. J. A. Reeves, with his book on " Sap," tries to prove that we are altogether on the wrong road; that sap does not ascend, but descends; and that gas does not descend but ascends in all trees and other plants. To the unprejudiced physicist and mechanician this theory of Mr. Reeves seems by far the most credible and intelligible. It is, for one thing, strictly in accord with the proved and universally acknowledged laws of gravitation. We all know that water naturally falls, and can only be made to rise under great pressure; absorption and capillary attraction can only raise it some thirty feet in wet wood, practically not at all in dry wood. On the other hand, gases naturally rise, and to reverse the process great force, exceptionally applied, mus be brought into play.

These facts brought home must be a fearful stumbling-block to Professor Huxley, though, doubtless, less so to Mr. Herbert Spencer. But we are told offhand that sap descends in autumn and rises in spring. Seeing the impossibility of getting liquids absorbed upwards by dry wood, how can we account for the alleged phenomena of rising sap in the dry trees in spring? In this connection it is remarkable that trees cut down early in the year before they are in leaf will often sprout out some months after they have been severed from the roots and stacked away. Another curious fact is that a tree which has been " ringed " near the ground dies at the root first while the upper part flourishes. Nobody has yet observed the rising of sap. Mr. Reeves has actually witnessed its descent. To do this our experimentalist tested his theory by removing a ring of bark from a growing tree. Soon the sap was seen to accumulate on the upper edge of the bark, while the lower remained dry; the sap gradually descended and hardened in the air. A branch cut close to the tree bleeds profusely in the upper part.

Testing theories is always the safest plan. We find roots the driest parts of plants, the leaves the wet-

test. If we carefully exclude the leaves from moisture the plants die, however much water may be applied to the roots. The roots are particularly dense in texture; the leaves offer a large surface, covered with innumerable little hairs for the retention of moisture, and mouths (or *stomata*) for its absorption. A great variety of trees and plants flourish in the most arid, sandy, and stony soil. If we examine sap, we find that in the leaves and upper twigs and branches it is almost perfectly limpid; it grows dense as it reaches the roots. The maple trees give a plentiful supply of water in the upper part, but the thick syrupy fluid from which sugar is obtained can only be tapped near the roots. All this goes far to show that the water, the principal constituent of sap, is taken in by the leaves and sent down to the roots; it grows thick as it descends by being exposed to the chemical influence of the rising gases. But it is not only water that is taken in by the leaves. The mineral constituents of the tree-blood also seems to be derived from the air and not from the soil*. Independent experiments on a wide scale have clearly demonstrated that our atmosphere is heavily charged with organic matter, dead and living, in organic atoms—the beams which we see in the sunlight-rays of a darkened room. Mr. John Aitkin found that the dust particles in the atmosphere of Cannes fluctuated between 1,500 and 140,000 per cubic centimetre. At the top of the Eiffel Tower 104,000 particles were found to the cubic centimetre; but this fell to less than 23 000 after heavy rain, so that clearly the rain had washed the atmosphere, and taken the organic and inorganic atoms to the vegetation below. At all events the air contains abundance of mineral and other solid food for plants; and when we find the leaves containing more mineral matter and greater colour than the roots, it seems hard to believe that our teachers have been over accurate in instilling into us the theory of rising sap.

Now, as to the gases. We must acknowledge that gases are plentiful enough in the air, but it is beyond dispute that those found necessary for the life and growth of plants are most richly elaborated in the soil. Plants with very deep roots are rarely fruitful. We know that soil dug up from great depths is practically dead, and will not afford a habitation for plants. Earth for successful plant growing must be impregnated with organic matter capable of decay, and consequently of evolving gas. This is an important point from the economic as well as the biological point of view. Fruit trees are found to prosper best and give the largest crops when their roots are near the surface of the soil. Indeed, some of the grandest orchards are partially paved at a depth of a few feet from the surface with large stones or hard pressed *debris*, which forces the fruit trees to spread their roots near the surface of the soil, where the decomposition of natural vegetable refuse and artificially applied manures are in the most active state of decomposition, and consequently in soil richly impregnated with gases. Roots, while ill-suited for absorbing water, can easily take up gases. We find the roots comparatively free from colouring matter and dry, the sap being thick. The gases in rising act chemically upon the sap, the water and its organic and inorganic constituents, and finally escape through the leaves, and even the bark. That a very large amount of gas is given off by leaves, flowers, etc., is an undeniable fact. We crush a leaf or twig between our fingers and obtain a more or less pleasant odour, and that this is due to gases can be easily proved, for many aromatic plants will soon charge the atmosphere of a closed room uncomfortable, sometimes even dangerously, with compounds of oxygen, hydrogen and nitrogen, some of which are probably alkaloidal in character. Indeed, to such a large extent is this the case with certain plants that the natural escape of gas from the rue plant on hot, still nights can be actually set on fire.

All this, it may be said, is very interesting, but what practical lesson does it teach us? The great practical lesson is this—the leaf is the most important part of the tree. If the plant procures its liquid and solid material for life and growth from the leaf, then clearly it is a mistake to be continually lopping and pruning, for by following this practice we reduce the assimilating powers of the plants. This seems to be proved by the fact that heavily pruned trees are constantly throwing out suckers and shoots—in reality endeavouring to extend their foliage in order to compensate for their mutilation. Cultivated trees that are pruned and deprived of their life-giving foliage decrease in strength, and fall easier victims to disease than the heavily-foliaged trees in their natural state. If, therefore, we are to accept the descending sap theory, we shall have to spare the upper branches and cherish the leaves. Again if the sap, the water with its organic and inorganic matter, comes from the air, and the gases from the soil, then the recognition of such facts would have an undoubted influence upon our present methods of agriculture, depending upon arbitrary theories of soil exhaustion and rotation of crops. Agriculture will be as much a science as ever, but a more remunerative one, and our economics of the soil will have to undergo some modification.—*Globe.*

* This is very doubtful, as the mineral portion comes from the soil more likely—J. H.

PADDY, which forms the principal monsoon crop in the Madras Presidency, has this year been planted over an area of 1,272,100 acres, which is a little under the normal area. Gingelly, which comes next in importance, shows a slight decrease as compared with last year, but the most marked falling off is in indigo which has decreased from 191,900, to 114,200 acres. The cause of this is said to be the fall in the price of indigo, and also the late and insufficient rains. The reports from various districts show that the rains have, on the whole, been favourable. Cotton is cultivated over about 70,000 acres, but reports on the condition of this crop have not yet been received.—*Indian Agriculturist.*

NUTMEG CULTURE IN CEYLON.—We call attention to the letter of "W. D. G." further on on this subject. We do not expect that Ceylon will ever be the scene of any great extent of nutmeg, any more than of cacao cultivation, and for the same reason, the absence of good deep rich soil save in exceptional "pockets." But wherever the soil and climate are suitable and the nutmeg is found to grow, we certainly think that special attention should be given to it, even though the planter may feel that his children or posterity, rather than himself, are to reap the benefit. The lowest of "W. D. G.'s" estimates or returns—or R200 per acre—is so good as to encourage not a few to run after nutmeg cultivation.

FORESTRY IN BENGAL.—The Bengal Forest Department is a flourishing branch of the administration to judge from the financial results, which show a net profit for the last official year amounting to over $3\frac{3}{4}$ lakhs of rupees. The profit is very great in the Sunderbuns Division, from which Calcutta is supplied with fuel, as are also the important sugar and other works scattered through Khulna and Jessore. The Lieutenant-Governor is in favour of strengthening establishments as much as possible in this division, and of making free use of steam launches for inspection, it being generally believed that the revenue here is capable of much greater expansion. It is also desirable (His Honor considers) to free more officers for making working plans—a duty too generally neglected, and this can only be accomplished by reducing establishments where they do not pay, namely, in Chota Nagpore and Orissa. In the latter province work will probably be considerably reduced when the forest boundaries have been re-aligned by the exclusion of village grazing and fuel grounds—a measure to which the Lieutenant Governor attaches great importance in the interests of the cultivators.—*Pioneer*, Oct. 7th.

CEYLON CACAO AND THE DUTCH:

WHEN WAS CACAO FIRST INTRODUCED HERE?

The following note appears in the *Trinidad Agricultural Record* for August:—

Extract of Letter from Assistant Director Royal Gardens, Kew, to Superintendent Botanical Department, Trinidad. June 23rd, 1890. "With regard to Ceylon Cacao it is well to bear in mind that a good deal of this is produced by 'Criollo' Cacao introduced into Ceylon by the Dutch. This, I believe, will account for the fine colour developed by fermentation."

We should like to know where Mr. Morris got this idea: the explanation can scarcely account for the larger proportion of the superior Ceylon cacao.

Dr. Trimen, to whom we referred for information, kindly writes:—

"I have met with no records leading me to think that we are indebted to the Dutch for the cacao tree. I am rather inclined to think that Mr. Moon introduced it early in this century. The first record I have of it is in 1819, when it was advertized for sale in the old Botanic Gardens at Kalutara; and Moon includes it in his 'Catalogue' published in 1824. Cordiner, whose records refer to 1799-1805, does not allude to it as being then in Ceylon. We may, therefore, conclude on the evidence we have, that we got the plant between 1805 and 1819, and probably between 1816 (when Moon was appointed) and the later date. It is not possible to speak with certainty on the point, but it is probable that this was of the 'Caracas' variety, and that many of the trees in Peradeniya and elsewhere are lineal descendants. I find it was still being advertised by the Gardens as for sale in 1833.

"It was in 1834-5 that Sir R. W. Horton obtained a stock of seedling plants from Trinidad. These were cultivated at Peradeniya and at the Pavilion garden and elsewhere in Kandy, and one of them planted in the Army Surgeon's garden there was the source of the cacao on Pallekelle estate, first planted I believe about 1855. There is no doubt whatever that this consignment was of the 'Caracas' variety, and most of this kind of cacao now grown in Ceylon traces its origin to Sir R. W. Horton's importation.

"I am not aware of the date when the cultivation of this fine sort of cacao went out in Trinidad, but it appears evident that it must have been later than 1834, when we obtained it."

We are aware that Bennett ("Ceylon and its Capabilities") is often not a reliable authority, and probably Dr. Trimen has noted and discounted his statement quoted in our "Agricultural Review" (in "Handbook and Directory"). Bennett wrote:—

Theobroma Cacao.—I have had very fine specimens of the fruit in my own garden from trees planted by the late Jacobus Burnand, Esq., a Dutch gentleman whose name is deservedly remembered in Ceylon with respect and regard, for he was distinguished both by his zeal for the welfare of the island, through the introduction of the culture of valuable exotics from the Malay peninsula, and the Dutch islands of Java, Banda and Amboyna, and by his botanical acquirements. The nuts were equal to the finest I had seen at Penang and Malacca, or in the West Indies, and in no degree inferior, either in size or nutritious properties, to the best productions of South America.

All this is, however, quite compatible with Dr. Trimen's belief that the plant was not known in Ceylon before the beginning of the present century.

BARK AND DRUG REPORT.

(From the *Chemist and Druggist.*)

London, Sept. 18th.

ANNATTO.—Damp but fair seeds sold at 2½d, and one barrel ordinary St. Vincent at 1½d per lb.

CINCHONA.—Among the South American barks shown at today's auctions were 13 serons Huanoco, one of which attracted attention on account of its unusually fine quality. It consisted of fine medium to stout silvery quill, and sold at 1s 7d per lb. Such fine Huanoco bark has not been seen on our markets for a long time. Good stout brown quill sold at 1s 1d to 1s 3d, thin and broken mixed quill at 10d to 12d per lb. Of 32 bales Carthagena in very large prices part sold at 5½d to 5¾d for stout flat. For 3 sarons good strong quilly Loxa, partly very stout mixed, 1s 10d per lb was paid. The parcel of 134 bales Guayaquill bark, which were announced as coming up for sale, was offered today and mostly disposed of: fine thin even grey mossy quill, 1s 6d; partly silvery, woody 1s 1d to 1s 3d; long, thin brown, more or less broken, from 7d down to 5½d. Of flat Calisaya bark several parcels were offered, and some sales were made at 1s 8d to 1s 9d for good stout rather dark, 1s 5d for damage; these prices were rather cheap.

CROTTON SEED.—The market is quiet. The price ranges from 12s up to 18s per cwt., according to quality. At the auctions 12 bags fairly bright seeds were bought in at 20s per cwt. nominally.

ESSENTIAL OIL.—In Citronella rather considerable sales are said to have been made privately at firm prices. At auction a few drums were bought in. The quotation remains ⅝d to ¾d per oz. on the spot.

CEYLON TEA IN AUSTRALIA—MORE ABOUT MANA GRASS.

Meeting a gentleman this week who but recently returned from a visit to Australia, the question was put to him by me as to how Ceylon tea was getting on there. In reply he told me that he believed a good start had been made and that there was a fair prospect of very considerable success. But he said that he thought it a pity, from all that had been mentioned to him in the course of his inquiry in the several colonies he visited, that no agencies which were directly authorized by your Planters' Association had been established. He believed that if a choice of firms in the leading cities could be made to whom the imprimatur of the Association could be safely entrusted, the use of Ceylon tea would spread far more rapidly than it has any chance of doing under the present system of gratuitous distribution of teas. On my remarking that I had always heard that the difficulty as to this was in the status of your Association,—that i did not pretend to be a business body,—it was replied that the distinction set up was scarcely an appreciable one. "Surely," my friend remarked, "if the Association goes the length of purchasing and sending your teas, even although it expects to get no direct money return of it, it has adopted a business element, and I for one cannot see why it should not extend that adoption, for I am very certain that teas advertised for sale under the guarantee of the Association would find a far readier sale than the unguarded public are now disposed to accord to them." My answering observation was that I had always recommended some such course as he had suggested when endeavor was first being made to introduce Ceylon tea into England; but that without it the tea had become more popularly drunk than any other. "That's perfectly true," was replied, "but the conditions here and the condition in the Australian Colonies are wide apart in their characteristics, and if you don't take these into account you will probably find the progress made in Australia to fall greatly behind what has been achieved at home. Throughout Australia I find a guarantee to be required to induce its people to make a change in their ordinary course of tea drinking. You will find the education to a refined taste much more difficult to accomplish with the coarser palates of the Australian Colonists than you found with the more highly sensitive ones of the upper and middle classes in England."

You will doubtless have hoped to hear from me by this mail more as to the future of the mana grass experiments respecting which my letters have lately given you so much detail. Since last writing it has been told me that the first lot of the grass

which was obtained from Mr. J. L. Shand, and which gave such good results, was grown in districts closely neighbouring on Dikoya, whence the second lot was derived, so that it would seem as if mere locality of growth could not have materially contributed to the differences in result which have been experienced to the several trials made. But "a fresh hare has been started," and by myself, though I am unable to tell you yet whether there is a justification for hunting in a new direction. At all events there was this week shown to me a letter from Dr. Evans with which he forwarded a specimen of the grass (the second lot) as it left the boilers. "Why," I immediately said, "this is no more like what they received at the Poyle Mills and experimented with than chalk is like cheese." Nor more it was. What Dr. Evans sent was pure grass blade, quite unaltered in form from the green (or rather dried) grass. What was taken by me from the sacks at Poyle Mills (as you will recognize from the specimen sent you by me) was just like the heaps of fibre and dust resulting from rotten coir beating. A specimen of this has just been posted by me to the Syndicate in order that they may judge of the difference and make further inquiry, for really it seems to me certain that either some mistake has been made by Dr. Evans or else that the stuff which was sent to Poyle Mills and which proved such a failure in the working was not mana grass at all, but some other product which the firm who did the boiling had under treatment about the same time. Of course it is impossible for me to let you know by this mail whether or not my suspicion on this point can be justified. Personally, I feel very hopeful that some stupid mistake has been made which may account for the discrepancies that have become apparent as the result of the two sets of experiments and which have been so disappointing. But the Syndicate is by no means discouraged. It rightly says that one case of failure cannot negative others in which success has been attained, and its members are determined to pursue the subject fully out, feeling what great results may follow if they are ultimately successful. There is some probability, we now hear, that they may arrange to take over from Messrs. Curtis & Harvey the ton of the grass which, as you were informed by my last letter, that firm has ordered from Ceylon, and may be willing to defer themselves experimenting upon until a subsequent shipment can be obtained.—*London Cor.*

CINCHONA CULTIVATION IN BOLIVIA, SOUTH AMERICA.

The production of cinchona bark, or cascarilla as it is called, from which the alkaloid quinine is extracted, was for many years Bolivia's most important industry in the agricultural line; but during the last four years it has proved unprofitable, owing to competition in Java and the British provinces in southern Asia. That class of individuals known at home as "smart Alecks" are found even in this out-of-the-way corner of creation. One of these is a certain Señor Shucroft, who was a heavy planter of cascarilla a few years ago, prosperous and presumably happy. One unlucky day the idea struck him of sending a quantity of quina seed to his home government—that of Holland—thereby getting himself into the papers and winning the gratitude of posterity. In uncalled-for generosity he sent a very large amount of seed, with minute directions for its treatment derived from his own experience, and the suggestion that experiments be made in Java. The remarkable success of cinchona in that island led the British government to encourage its planting in Ceylon, and already the business is ruined everywhere by over-production. Mr. Shucroft received a little gold medal from the Dutch king in acknowledgment of his enterprise, but at the same time he lost all his fortune by having made valueless his own extensive cascarilla plantation.

DIFFICULTIES OF TRANSPORTATION.

Bolivia can never compete with those countries that now take the lead in cinchona production, because of her immense disadvantage in the matter of transportation. All her products must cross the successive cordilleras of the Andes on their way to the sea, mostly on mule back, at a cost of transportation not less eleven than Bolivians per hundred weight, an expense five times greater than that of carrying it from the coast around Cape Horn to Europe.

On the other hand, the bark produced in Ceylon and Java yields only two-thirds as much sulphate of quinine as that grown in this part of the world. Fully nine-tenths of Bolivia's cascarilla is of the red variety, known as quina morada. As an example of the rapid depreciation in the price of bark may be mentioned the Erickson plantation, which was valued at 1,500,000 Bolivians five years ago and is now offered for sale at less than a quarter of that amount, but cannot find a purchaser.

The number of quina trees now under cultivation in Bolivia is said to exceed 15,000,000, about two-thirds of them being in the province of Mapiri, near the northern border, whose business centre is Sorrato. The department of Yungas cultivates half a million trees and a great many are grown in the Beni province, farther to the east. It is impossible to get any reliable statistics regarding Beni's productions, because they all go to the eastern coast of the continent via the Amazon and its tributaries. Indeed, there are no printed statistics of any kind concerning Bolivia's exports or imports, and no history of the country was ever written except one small and very incomplete edition in Spanish published forty years ago.

TREATMENT OF CINCHONA.

As to the treatment of cinchona—at this distance from the equator it will not grow at a greater elevation than 5,000 feet, nor lower than 3,000. The seeds, which are sown in beds, are so very small, lighter than the lightest thistle down, that the least breeze will blow them away, necessitating great care in the handling. When the plants are about one foot high they are transplanted five or six feet apart to the sunny side of a mountain. It is asserted that virgin soil is absolutely necessary and that the addition of any kind of fertilizer would be ruinous. Twice every year the earth between the tree is slightly disturbed by the primitive plows of the country, and that is all the "cultivation" they require At the age of eight years the trees are ready to strip, or if the owner is hard up, as is usually the case, a part of them may be utilized sooner and young plants put in their places. In some sections it is customary to remove from each tree about a quarter of its bark every year, but here the tree is cut down to the ground, its trunk and large limbs peeled and the smallest branches carefully scraped clear to the leaves. An eight-year-old tree yields from twelve to fifteen pounds of bark, which in the present depressed state of trade is worthy only about seventy-five cents.

THE QUININE TREE.

If the peeled-off bark happens to get wet, it loses much of its alkaloid quinine; hence every planter has to build ample sheds in which to dry it. The trunk of the tree, after having been peeled, is entirely valueless, not even good for firewood in a country where fuel is scarce. The cost of cutting, drying and packing the bark is about $1·90 per hundredweight. The process of packing is as follows:—A box is lined with coarse sacking and then a layer of banana leaves. The bark is put in and pressed down with machinery until the box will hold no more and the scale indicates exactly one hundred pounds. It is then removed from the box, banana leaves and all; a second sack is added and the whole bound tight with raw-hide thongs. There are no fewer than twenty-one varieties of the quina tree, some worthless, others ranging in the amount of quinine contained in the bark from one-half per cent to seven per cent. The buyer must know his business, for if not an expert he is likely to be badly sold. The "gold brick" swindle has not been so often perpetrated in the United States as that of selling for cascarilla the worth-

less bark of some other tree. A well known dealer of La Paz, who ought to have known what he was about after years of experience, recently lost $160,000 at one fell swoop on a ship load of bark supposed to be cascarilla, but which, when arrived at the English market, turned out to be a species of oak, good for nothing at all. The only way to test the bark is by tasting it. That which gives out a bitter taste immediately on being taken into the mouth will yield a comparatively small amount of quinine, while the best must be chewed before the quinine taste is apparent.—*Exchange.*

NATIONAL WOOD SUPPLIES.

Bulletin No. 4, just issued by the Division of Forestry, is a sequel to some previous publications of the division which discuss the relations of railroads to the wood supplies of the country, with reference to the conservation of our forest areas. It contains a brief discussion by the chief of the division, setting forth upon the basis of a recent canvass among the railroad companies the enormous consumption of wood material for railroad construction, and especially showing how future supplies are being endangered by the use of the most valuable timber and of the young growth. To satisfy this demand requires the annual culling of the best timber from probably more than 1,000,000 acres of our natural forest lands. The chief value of this part of the bulletin consists in the directions which are given for increasing the durability of wooden ties. These are found to last on the average less than seven years, so that for replacement alone an annual cut of 80,000,000 ties is required. By lengthening the life of the tie a single year it is evident that a considerable saving would be effected, tending to reduce transportation charges and also to husband our forest supplies. For lengthening the durability of ties various means are suggested, among which are the selection of lasting timber, proper care in the seasoning of material, attention to the drainage and ballast of the road-bed, precautions against fungi, improved methods in fastening rails, and various preserving processes, some of which are new. The information here furnished is likely to be of value to any consumer of wood material.

The bulk of the bulletin is taken up by a report of R. E. Tratman, C. E., collating the experience of the world in regard to the substitution of metal for railroad ties. It had been stated hitherto that metal ties were used experimentally, but that the time for their introduction was still far distant. This report shows that not only are there something like 30,000 miles of railroad track of the world laid on metal ties, but that where these ties have been used most extensively, namely, in Germany, India, and the Argentine Republic, they have shown themselves superior to wooden ties in producing a safer, more permanent, and in the end more economical track.

The report is exhaustive, full of the detail which alone can make it valuable to the engineer, and promises to be an important aid to the metal tie question, which in this country has received little consideration, from the belief that it is either impracticable, or with our seemingly inexhaustible timber supplies premature. The use of the metal tie is expected to economize wood supplies and by its cheaper maintenance and other favourable features to reduce transportation charges and increase rapidity and safety of travel.—*American Grocer.*

TEA NOTES: DARJEELING, Sept. 20th.—Some very good sun commencement of week, which has brought on fair growth. Foggy though latter end, with rather too cold rain to make heavy flush. Rainfall to date 121 inches.

CEYLON TEA IN RUSSIA.

To the Editor of the *Tropical Agriculturist,* Colombo.
Kandy, Oct. 11th.

SIR,—I beg to enclose letter received from Mr. M. Rogivue on the subject of making known and pushing the sale of Ceylon tea in Russia.—I am, sir, yours faithfully, A. PHILIP, Secretary.

Moscow, 30th Aug./11th Sept. 1890.

A. Philip, Esq., Secretary, Ceylon Planters' Association, Kandy.

TEA FUND.

Dear Sir,—I wrote you last from St. Petersburg on the 23rd July/14th Aug. I have since been in correspondence with Mr. Wm. Martin Leake of London, to whom I have asked to communicate to you the contents of my letters.

ST. PETERSBURG.—As I have already informed you I visited there all the principal tea merchants, most of them were in Nijni at the time, but everyone I have seen has tasted my samples of Ceylon teas, and before leaving that place, I have left to Mr. D. Haverlandt, who will act as my agent there, all the necessary instructions by samples to continue the work, see the people and push the business. I hope that orders will soon follow, when the parties interested return from Nijni.—I have also distributed more than 150 lb. of tea, in 1s 8d and 1s 4d lb. packets, all over the town, to restaurants, tea houses, public bars and friends.—The general report is that the tea is good. More was impossible for me to do, I had to leave for Moscow, having been in St. Petersburg quite enough time, a little over than one month.

MOSCOW.—I arrived here on the 13th/25th August and lost no time in visiting the firms interested in tea, such as

Alexis Gonbzin's successors (Héritiers) A. Kousietzoff & Co., the first and best wholesale tea house in Russia.

Vve. Rostergueff & Successeurs }
,, Catairo & Fils } Second best
Wogan & Co. }
Quizinoff Bros.
Behrend and Stern &c. &c.

and Popoff Bros. & Co., first retail tea house in Russia having over 30 warehouses and shops in every large town, such as St. Petersburg, Moscow, Odessa, Riga, Varsovia and other places all over Russia.

Most of their principals being in Nijni, I thought best of going there to see them. I did so last week. They have all taken great care and trouble in tasting my samples, compared them with Chinese kinds, Caravan and others—and, I am glad to say, reported very favourably upon their quality which they say, is on the whole far superior to that of the equivalent grades of Chinese kinds, against which the present general complaint is, that they are getting every year more and more inferior. They find our teas well made, of fine flavour and good liquor, but would prefer them of somewhat darker infusion than the ones I had to show them, viz.:—

"Aberdeen" }
"Mahousa" }
"Patiagama" }
"Ferndale" } Pekoes.
"Glengariffe" }
"Labukelle" }
"Rahatungoda" }
"Labukelle" } Pekoe Souchongs.
"Kuruwitte" }

The "Labukelle" and "Rahatungoda" pekoes have been found the finest of all these teas, but rather too pale of infusion, and, as pointed out above, teas of a darker colour in cup, which would keep about the same for the second and even the third infusion,—the same as Chinese teas do—would be preferred.

I remarked in my previous letters the way of making tea in Russia, viz:—To pour in the tea pot—sometimes up to four times—boiling water on the same tea; the first infusion is of course darker than the second and so on, but the last must still have enough colour for appearance's sake, although there is no

more, or very little taste remaining in it, and this is the reason why the Russian market required dark liquored teas, just the contrary than what I had been told in London, where very little indeed is known about Russian tea business.

This, of course, applies chiefly to teas sold to the general public in Russia—the common people—which are the largest consumers. Better classes drink better tea and some of them make it better with one infusion only—broken pekoe of any "Labukelle" sample or equal to it—would do for them very well, but, as a rule, fine and finest teas are sold in much smaller quantities than common and medium to good ordinary qualities.

Now, as to the question: "Whether Ceylon teas will suit the Russian taste," and "whether they can be introduced in the country, to be drank as pure Ceylon teas and supplant or replace Chinese kinds," there are two ways of answering it:—The large and wholesale Merchants will say, no, but I have no hesitation in saying yes! The wholesale merchants—importers—much more conservative, in their way of trading, than the consumers, in a matter of taste, pretend that Ceylon teas cannot be drank by themselves—pure—and appreciated by the public for their merit, because they are not known well enough and do not suit the Russian taste. This is their old and only song, and they say, that they can only be used for blending purposes, mixed with Chinese teas, and it is easy to understand that these importers who, finding their profit in selling to retailers, mixture of any kinds of all sorts of teas, which they have introduced, and have made known, will not take the trouble now to introduce any new kind, against which they have at first, a sort of antipathy and which they think could perhaps stand the risk to remain for some time unsold in their stores. The Retailers think exactly the same, and the Public—the consumers—who up to the present time, have never had the opportunity of seeing, buying or drinking anything else but what was offered and sold to them in retail shops, are therefore cut out entirely of "Pure Ceylon Tea," and cannot get at it! In St. Petersburg and here, I repeat it, everyone, friends and others, who have tasted my samples, have found them excellent, cheap, even in the good qualities, and economical, and have asked me where the tea could be bought in retail; this of course I was unable to answer just at present for the simple reason that nobody sells it pure, but I told them that it would be the case before long.

In Nijni-Novgorod, installed in the shop of a friend, a watchmaker, visited by a large number of people of all classes, Russians, Siberians, Tartars, Armenians, etc., etc. I had some of my samples made in cup and offered, to every visitor, some of it. The voices were unanimous to declare the tea very good and cheap, and who 10 lb., who 20 lb., etc. everyone, wanted to buy some; and asked me where to get it, but I could not sell my samples—having no license for retail. The fine in Russia is a heavy one, for the sale of any article without a license.

This is to show what the general public think of these teas and that they would buy them if they were to be got anywhere in Russia, in retail. And I can say, that to only friends and acquaintances, here and St. Petersburg, I could, at once, sell over 1,000 lb. of tea at a good and very profitable price, if I had a stock and a license.

Mr. Hadimiroff (in Nijni) head partner in the large firm of A. Dousentzoff & Co. has taken special trouble with my samples and pronounced himself very pleased with their quality; he is of opinion that Ceylon teas will have, before long, their time in Russia and be drank extensively all over the country, will sell well and replace advantageously the Chinese kinds, which are getting now so bad and inferior in quality. He promised me to give a trial order of some importance, on his return to Moscow—in about a week's time—but says, that it would not do for his Firm to advertise and make a Réclame for the tea:—Large and wellknown Firms (wholesale) in Russia it appears, do never advertise.—This I do not understand and I am afraid that, here again,—even with a large order from this Firm—we shall miss our object in bringing the article, as "Pure Ceylon Tea," within the direct reach of the consumer.

I have already written extensively on the question. I consider that I have also done a great deal of good for the object of my missions, although it is nothing when considering what remains to be done,—and I come now to the conclusion that, the only way of introducing "Pure Ceylon Tea" in the country, quickly and surely, is to give the public the opportunity of buying it as such, and this is only feasible by opening here. Moscow is the centre of Russian business and the largest market for tea. And for other places, depôts of Ceylon tea and retail warehouses for its sale. The first enterprising man to do it will make his fortune in no time. It will be objected, I am sure, that the very fact of his doing a retail business might influence the wholesale trade in combining to shut him out of the market altogether; this may be correct but, I repeat it, the importers, although perhaps willing to give a few orders will only use Ceylon tea for blending purposes and will never introduce it to the reach of retailers and consumers—for its own merit, whatever it may be, good or bad,—to prejudice another article they have already introduced, and are selling easily and advantageously and, supposing even that some of these importers give some orders of a few hundred chests during the year, just as they did, through London houses, before my coming here, mix the tea with some other kind and take perhaps one year to sell that quantity and order a fresh lot, here ends the business and the aim your Association proposed, in sending me here, is not attained.

In accordance with the foregoing remarks, what I would like to do, is:—

1st. To have here, in Odessa, Riga, St. Petersburg and even Varsovie, stocks of Ceylon tea in low medium and fine qualities of pekoe and pekoe souchong, very little broken pekoe,—say about 2,000 lb. of sorted in each place to begin with, of well made teas, not too black, of good aroma, mild, mellow and soft flavor and liquor, not too pungent, but of somewhat dark-reddish coloured liquor.

2nd. To open a small office in Moscow, and

3rd. A few retail warehouses at above-mentioned places, in order to sell tea by packets of $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ and 1 lb. or more voluminous packets, by chests and otherwise, and

4th. To start a well conducted Réclame by means of Government analysis—published in newspapers, advertisements, circulars, placards, pamphlets, etc., circulated and distributed all over Russia.

In my opinion, this would be the only possible way of obtaining success and, I am sure, would prove, before long, a very good and most remunerative business, which could also be extended to other products of Ceylon and export of Russian produce.

Duty paid Chinese teas, mixtures or others, are sold in the country from Roubles 3·50 kop. downwards to Rbl. 1·25 kop. per Russian Pound, as per quality, and taking a Ceylon pekoe or pekoe souchong, superior in quality to the lowest Chinese or mixture tea, sold here at Rbl. 1·25 kop. Something for instance equal to my sample "Kuruwitta" pekoe souchong, bought in London, first cost at 9d per Eng. lb.

charges to Odessa, Riga or St. Petersburg	$1\frac{1}{2}$d	"	"
about $\frac{1}{2}$ penny per lb. to be added for railway freight to Moscow	$10\frac{1}{2}$d	"	"
and say Rbl. 8·30 per £ str. average rate of exchange, equal to	37 kop.	"	"
plus	89 "	"	"

for duty, customs and other charges would cost Rbl. 1·26 per English pound or (1/10th less for Russian pound) Rbl. 1·15 at any of the above sea ports or Rbl. 1·17 in Moscow, which tea selling at only. Rbl. 1·25 here would leave a gross profit of 8 kopecks per pound. This calculation is based on the clearing at St. Petersburg of my 671 lb. samples, but duty, customs and other charges could be considerably reduced on a larger quantity imported at a time and of course duty alone being the same on ordinary and fine teas, the profit would be much larger on the latter qualities.

Shipments to Odessa direct from Colombo, would again be more advantageous and when shipped by the steamers of the Russian Volunteer Fleet could be stored free of rent for any length of time, in the Company's bonded warehouses; this has been offered to me by Mr. Vachtine, Director-Inspector of the Company.

As to quantities to be sold the future will show it as soon as Ceylon teas begin to be known in the country. I do not like to anticipate with figures, but it may interest you to hear that it is calculated that the firm Popoff & Co., the largest retail tea house in Russia, is selling alone over 50,000 pounds of tea daily in their various stores all over Russia, and supposing that I would sell only 10,000 lb. per month for the first and even the second year, or 120,000 pounds a year,—and this quantity I have, no doubt, would be easily reached—at an average profit of 15 kopecks a pound only, this would leave a gross profit of 18,000 roubles to cover expenses which I estimate about as follows:—

		Rbl.
Réclame, advertisements, circulars placards, cards, printing, etc.		5,000
	For one Year.	
Rent of office in Moscow	500	
Furniture for same	250	
Wages to men	500	
My own expenses	2,000	
		3,250
Rent of 5 warehouses and furniture... ...		6,000
Five Licenses at Rbl. 200		1,000
Wages to 5 warehousekeepers		3,000
Interest, insurance and travelling expenses ...		1,750
	Say, Rbl.	20,000

Thus clearing in the first year all the expenditure and stock-in-trade as I do not admit that the profit is to be only 15 kopecks per pound of tea—this can easily be doubled. The article is then introduced with all probabilities of a splendid and increasing business in the following years.

For this, a capital of about Roubles 25,000 would be necessary to cover the first advances and start the business on a sure footing viz. Duty and charges are 10,000 pounds of tea say a

rouble 1 per lb.	Rbls.	10,000
First urgent réclame to be made in starting	„	2,000
½ year rent in advance for office and five Warehouses	„	2,000
Furniture for office and Warehouses	„	3.000
Five licenses	„	1,000
½ year Wages, Salaries, Insurance in advance	„	1,500
Travelling expenses and sundries	„	500
Roubles	„	20,000
plus about £st600 or say	„	5,000

To cover the value of about 10,000 pounds of tea Cost, freight and Insurance at one Russian Port. Or say about £st3,000 to float on a good scale, the whole concern which could be, of course, extended later on proportionally as for the yearly results of the business.

Now for the enterprising man to advance this money, I have no hesitation in guaranteeing him the success. This would be a good thing for a Colombo firm interested in tea business. Remember that all the tea retailers in Russia have made their fortune and are wealthy people, and that as Mr. Vladimiroff told me Chinese Teas decreasing considerably in qualities as well as in quantities, it is now the very favorable time for introducing Ceylon Teas in Russia.

Moscow will have next year about June 1891 a large exhibition, and I think that Ceylon ought to be well represented with a large kiosk for tea and a good collection of other Ceylon produce.

Please give the foregoing your very earnest consideration and place these remarks before the Committee of your Planters' Association "Tea Fund" who, I hope, will understand that to do such a difficult work like the one I did undertake to do, I must be well supported by means of more liberality.

As regards Funds: It is useless for me to repeat that the £st100 granted to me by your "Tea Fund" Committee was quite inadequate and insufficient to do what I have done up to this day travelling from Switzerland to London, where I had to stay over a fortnight, to St. Petersburg, via Berlin and Königsberg two days in each place, and over one month's stay in St. Petersberg, to Moscow and Nijni Novgorod and stay of already three weeks between both places! When you add to this, all sorts of expenses such as duty and charges on Tea samples over £st80! Printing matters, carriages, hire, packing of tea, rent of godown, interpreter, tips, postages, &c., &c., you may easily believe that I have already spent over than double that amount of which more than £st100 are out of my own pocket, considering moreover that I only received £st86 out of the £st100 granted, Mr. Leake having kept the balance of about £st14 to cover the surplus of Messrs. Malcolm Kearton & Co.'s invoice for Tea Samples, which I had to increase over the £st30. granted by the "Tea Fund" Committee for their purchase in order to complete my assortment in every desirable grade and qualities suitable for the Russian market. I may just as well inform you that I am now left here without money, in the most difficult position and not knowing what I have to do: "Abandon the field and return home" or "Hang on a little longer with the hope of getting a further allowance from your Committee to enable and to continue my work"?

But as winter is drawing now very near, I should like very much to know, before long what is to be decided.

I do fear to remain during the winter, idle and without means, in a country like Russia, where the life is so expensive, and I would be very thankful to your Commitee to take a decision without further delay.

It is quite true that it was my own proposition to come to Russia and that the amount I have been granted for my expenditures, was the figure stipulated by me. When I estimated at a £st100, the approximative amount of my expenses, I did it in perfect good faith not knowing what a country Russia was. That the duty on Tea was so high, and with the hope that the "Tea Fund" would be liberal to me after a first start here as expressed in the resolution of its Committee. It was only in London that I heard more positive information and I remember having heard Mr. J. Capper saying:—That it was ridiculous to expect anyone to do this work with so little money quite inadequate to it. My previous reports from St. Petersburg have proved it superabundantly, but I left London for this country encouraged by many that the Ceylon Tea Fund Committee would understand my position and reconsider their former decision.

I acknowledge having made a mistake in my estimate of expenditure, but is it a reason why the scheme should now be abandoned, when I am so near and so hopeful of obtaining success, and should the first money spent, be left behind without return at all? With my work not even half done. This would be a very sad conclusion to my mission! I do not pretend having shown yet any satisfactory results, but, I consider having done already good work, and I am sure that I could obtain a complete success if more money was to be spent and if I was well supported in my above proposals. Why could not a Company be floated for this purpose in the same way as Mr. Pineo did it for America. This is well worth considering by your Ceylon merchants and capitalists. The capital required is not a large one and I think shares could be easily placed.

Duty on every article or produce—except tea—imported in Russia has, since a week, been augmented of 20 per cent.

The Nijni fair was a very interesting sight, it closed last Saturday, the 25th August/16th September. Confirming my card from there, I beg to remain, dear sir, yours faithfully, M. ROGIVUE.

1st/13th Sept.

I have written to Mr. Leake regarding the packing of Ceylon Tea, he must have communicated my

remarks to you and I hope that something will be done in Ceylon to improve the packages, at any rate for shipments to Russia.—My present address is care of Madame Mathey, Maison meublée, Grande Nikitsky, Moscow, and in case a telegram should be addressed to me, Rogivue, Mathey Nikitsky Moscow, would do. Again yours faithfully, M. R.

A FUEL SUPPLY FROM WASTE GRASSES.

The rapidly narrowing field from which our needed supply of fuel can be drawn, and the widening demand due to the consumption necessary for the curing of tea, justify us in considering every possible suggestion that can be made for averting a difficulty already felt and promising soon to increase in seriousness. With many suggestions emanating either from correspondents or started by ourselves we have dealt on previous occasions, and we do not propose in this article again to discuss them. But few of these have been put to a practical test, and it is impossible, therefore, to say whether any of them will fulfil the hope entertained of them or not. But just now very much interest is felt at home in what have hitherto been the waste products of the island, and the more the utilisation of these can be promoted, the greater the gain, both present and prospect, to the Colony.

As an instance of such utilization, we can well recollect the time when the accumulation of coffee husk or chaff in the Colombo mills of that day was found to be a positive nuisance. Trials made, however, proved it to be an admirable fuel for steam boilers, and while the supply could be kept up we believe every steam factory in Colombo fired with this material. At the Government Factory its use gradually superseded that both of wood and coal, with the result that a very large saving was effected. That was a single case in point, and it emboldens us to write further on a subject with the technicalities of which we do not profess to be acquainted, but which, under the circumstances, may be found to be deserving of some thought by those whose interests are becoming greatly affected by the scarcity of fuel within our planting districts. We have but lately been informed by our London Correspondent, that Messrs. Curtis & Harvey, the well-known manufacturers of fine gunpowder, believe that it may be found to pay them to import from Ceylon a quantity of mana grass for the purpose of making charcoal. Now in the production of that article a very great amount of heat is evolved and lost. The question is, whether from the many varieties of grass which cover waste lands in this island charcoal could not be made in a special apparatus, the wasted heat from which could be availed of to do us valuable service while leaving the residue as a marketable commodity? If this could be accomplished a distinct step in advance would be made towards solving the difficulty apprehended as to our future fuel supplies.

Of course we know that dried grasses of this kind burnt in an ordinary furnace would be simply flashed away uselessly by the strong draught, and would leave an ash certain to choke the bars and flues so as to completely check after-combustion. But, assuming that they were fed into some kind of incinerator which would utilize the heat of the gases evolved for general purposes, leaving behind a pure charcoal, it is possible, we think, that if the latter were possessed of sufficient value for export or home use, this question of fuel supply might in a great degree be satisfactorily solved. As to this last point, we can only say that if Messrs. Curtis & Harvey believe that it would pay them to import the grass and burn it into charcoal at home, there is good ground for us to believe that it would pay our planters to transform it on the spot, using the wasted heat we have written of for their own purposes and exporting the charcoal produced. We must leave it to those better acquainted with the character of such processes, to determine whether or not the idea that occurs to us is in any way feasible. As we have on previous occasions said, we do not offer our suggestions on this and kindred matters with any conviction of their full practicability. But there is often a shade of truth and a grain of practicability even in the most crude ideas ; and in the face of anticipated difficulties we do not hesitate to propound any scheme which might from bare theory be advanced by experts to practical usefulness.

NOTES ON POPULAR SCIENCE.

BY DR. J. E. TAYLOR, F.L.S., F.G.S., &c., EDITOR OF "SCIENCE GOSSIP."

Some months ago I drew attention to Mr. D. Morris's paper, read before the Linnæan Society, on the fruit of the sugarcane. The practical result of that paper is that seedling sugarcanes are now being grown in Kew Gardens. The Government of Barbadoes took up the question in great earnest, and they have just published a valuable report on the seedling sugarcanes, in which are fully recorded the interesting results obtained on the experimental fields at Dodd's Reformatory in that island.

I observe that the Italian navy has recently been trying a new fuel—a mixture of kerosene and coal-dust. The men-of-war thus fired are said to have increased their speed by its use two knots an hour. This will be very convenient in war time for a battle ship to get away. However, one drawback is recorded—the increased heat seriously affects the boiler-plates. Then who is going to sit on the safety-valves?

You have in Australia nearly all kinds of climate and physical conditions for the growth of plants. It is no good drawing anything that the world does not want. Therefore, the following facts may not be without interest. Perhaps we should never have heard of India or the Malayan Archipelago, nor would Europe have been embroiled in a host of wars, if it had not been for the spices those lands produced. With the increased growth of the world's population the amount required is of course increased. Take cloves for example. Not only are these rice fruit-capsules the most pungent of spices, but an important oil is now extracted from them for microscopical and other purposes. One cannot wonder, therefore, that the cultivation of cloves has become a speciality. Sixty years ago the plant was introduced into the Island of Zanzibar, so that it may have influenced the Arab slave trade, just as the introduced cotton-plant is historical associated with the importation of niggers into the Southern States of America. However that may be, the chief supply of cloves now-a-days is not from India but from Zanzibar, where it has been cultivated to a high state of perfection. In that island a ten-year-old plantation of clove trees produces an average rate of twenty pounds of cloves per tree, while trees twenty years old frequently produce fully one hundred pounds. It is stated that the yield of cloves from Zanzibar alone for this year will amount to thirteen millions of pounds, the average market price being 5d. per pound. Surely, in many of the tropical regions of Australia there must be opportunities even for planting clove trees.—*Australasian*

RICE GROWING.

The accompanying figures and information may prove useful as shewing the value of Rice planting. The land planted was the bottom of ordinary drains in portions of land laid out as Banana and Cocoa plantations. It is not general in Trinidad to take advantage of the drains to raise a crop, but the experiment shewn here proves that it can be done without

damage to the drains or detriment to the land. In fact to a cocoa planter growing Rice in the drains, especially on flat land is a perquisite, and now that indentured labour is being employed on such estates there is everything in its favour, for sufficient Rice might be grown to furnish the labourers with their staple food for the year, and this might be done year by year, as the decomposed vegetable matter on the higher ground washes into the drains and remains there to a great extent would thus supply manure to yearly raise a crop of splendid Rice. Shade does not appear to interfere with the growth or ripening of the grain, this has been fairly tested for three seasons on land fully shaded by the large growing gros michel banana. The general result compares favourably with Rice growing on open ground.

No. 1.—SOWING IN JUNE.

Collected area of drains 9,220 square feet or little less than one acre.

			£	s.	d.
Rice for seed ...	38 ℔ @	1d. ⅌ ℔ ...	0	3	2
Sowing	3days @	1/0½d. ⅌ day...	0	3	1½
Reaping	21 „ @	„ „ ...	1	1	10½
Threshing & winnowing	12 „ @	„ „ ...	0	12	6
Cost of Labour, &c. ...			£2	0	8

Reaped 1,250 ℔ Rice, weighed after threshing @ 1d. per ℔=£5 4 2.

	£	s.	d.
Value of Crop	£5	4	2
Labour, &c.	2	0	8
Profit ...	£3	3	6

No. 2.—SOWING IN JUNE.

Collected area of drains, 12,800 square feet, or rather more than 1 acre.

			£	s.	d.
Rice for Seed ...	21 ℔ @	1d. ⅌ ℔ ...	£0	1	8
Sowing	5 days@	1/0½d. ⅌ day...	0	5	2½
Reaping	34 „	„ „ ...	1	15	5
Threshing & winnowing	12 „	„ „ ...	0	12	6
			£2	14	9½

Reaped 1,350 ℔ Rice, clean in husk @ 1d. ⅌ ℔ £5 12 6

	£	s.	d.
Value of Crop ...	£5	12	6
Labour, &c. ...	2	14	9½
Profit ...	£2	17	9½

No. 2 shews a larger area planted with not such good results as No. 1. This is accounted for by roots not being so well cleared out of the drains of this portion.

From experiments I find that by cleaning the Rice from the husk in the primitive way the Coolies clean theirs, a loss of ¼ lb. takes place. This would bring the weight of crop to 1,950 ℔. Two coolies can clean 60 lb per day. The total result would be as follows:—

	£	s.	d.
2,600 lb less ¼th = 1,950 ℔ @ 1d. ⅌ ℔. =	£8	2	6
Deduct 2 men, 30 days, @ 1/0½d. per day =	3	5	0
Profit on 2 acres ...	£4	17	6

The sowing was done by Coolies in their own style, simply passing up the drains and at every few inches making a scratch with the hoe, dropping in the grain and at the same time covering in the ground with the foot. Nothing further was done until harvesting. Of course, the rest that follows is well known, as the Coolies may be seen going through the operation any day of the year at their doors. With machinery for winnowing and making white rice, much more favourable results could be obtained. But the experiment is worth trying, it could be done on shares with the labourers or contractors, or the proprietor might take the whole risk which I feel satisfied would not be great on favourable land.—*Agricultural Record.*

THE FUNCTIONS OF THE BOTANIST

were thus indicated in a lecture delivered by Mr. J. H. Hart, F. L. S., Superintendent of the Royal Botanic Gardens, Trinidad:—

The study of Botany is too wide for any one man, but yet the teaching of the first principles of the science is essentially necessary to a purely agricultural community, and should form one of the first considerations of our educational sytsem. That teaching also which gives a knowledge of what are known as the lower forms of vegetable life is coming daily more necessary to all sections of every community, for how few are there who are aware that as the vegetable kingdom provides for the sustenance of the human being, so also does it produce agents which are destructive to the human body. The many germs of disease which are present among us have been found of late years to belong almost entirely to the field of botany. The ferments without which even our bread cannot be made, our wine, or tobacco, prepared, are known to be caused or set up by infinitesimal organisms which belong to the vegetable kingdom. The fungi which causes dry rot in houses—spoils the taste of our wines, and turns sweetened liquor into vinegar—the bacteria of fevers, and other diseases of man and animals—and also the germs which cause and propagate disease among so many plants, are now referred almost entirely to the vegetable kingdom. There are of course the harmless, as well as the destructive and baneful species, and it is a part of the work of botanists to find out their life history to enable those whose special work it is to counteract the influence of those which have mischievous effects upon either plants or animals. So much has this become the work of Botanists that in stating the qualifications for a recent botanical vacancy it was especially laid down by the Legislative Council of that Island that the incoming officer should be a competent Bacteriologist. Travelling into a secluded part of Jamaica shortly afterwards I was entertained by the District Medical Officer, and the subject of Bacteriology was introduced into the conversation through it having lately appeared in the newspapers in relation to the before mentioned appointment, but I was completely stumped when the venerable doctor asked me the meaning of the world Bacteriology. It was evident, therefore, that the old gentleman was not able, or only able by "rule of thumb," to crush an enemy of whose form and habits he was entirely ignorant, and I ask you to whom would you sooner trust your lives—to the hands of a man who keeps up with the progress of medical science, or to one of the old school practitioners who prefers to fight the enemies of human life without a knowledge of the character, form, magnitude or life history of the organisms which cause disease in its various forms? Thus the first class Botanist, instead of being merely a walking dictionary of long names, has to become a microscopist, and to be a microsopist, has to possess a primary knowledge at least of the elements of Chemistry. Botany is therefore elevated among the list of important modern sciences of late years, for no medical student can become competent unless he knows the series of facts which the science of Bacteriology teaches. Only a few years ago it was, I believe, almost impossible to diagnose with any degree of certainty the state of the human lung known as Tuberculosis. While now with the aid of scientific facts recently brought to light, that disease, Leprosy, and many others (daily increasing in number) are each to be readily determined by the presence of the special Bacterium which is peculiar to each disease.—*Royal Botanic Gardens Bulletin.*

MANA GRASS EXPERIMENTS.

It has not been possible for me since last writing to have the mystery about the Mana Grass last experimented upon cleared up. There is such a strongly marked difference, however, between the specimens of the boiled outturn, that my confidence that some careless error has been made must remain until it

can be indisputably upset. During the week opportunity has been afforded me to test specimens of the grass which have been long subjected to steeping in water i n.y. It was possible to draw from the stalks so treated two very distinct characteristics of fibre. Those stalks which were well matured gave a long and comparatively tough fibre; those of a more immature growth yielded a very short fibre on being separated by the fingers, and this broke readily. It, therefore, seems very feasible that Dr. Evans's suggestion that the two lots of grass experimented upon had been gathered at different stages of growth, and that the fact might account for the variance in result obtained during the experiments made, may have been a correct one. But at present this point remains undecided. It has been told me that a proposal has been made to the Stanley-Wrightson Syndicate that it should take steps to obtain from Ceylon a complete collection of samples of wild growing grasses, each sample to be distinctly labelled with all possible information regarding stage of growth, locality of production, &c., and that these should be submitted to careful laboratory testing. This proposal bears a close analogy to what a previous letter by me recommended; and if it be acted upon information might be obtained which would be likely to prove extremely useful in determining what grasses that your island affords would prove most economically useful for the purposes the Syndicate has in view.

Only this week a conversation was had by me with a gentleman well versed in tramway engineering relative to the best methods for working any system of tramways which may eventually be adopted in your larger cities and towns. On my mentioning electricity as offering to my mind the best method, he remarked:—"Perhaps you may not be aware of a very serious difficulty which has lately been discovered as to this course. It is found that unless a very heavy expense is gone to for the insulation of tramway lines, probably £1,000 a mile—the earth in the neighbourhood of such electrically-worked lines becomes polarized over a large area, and no telephone wires or any other telegraphic system using the earth for return currents can be worked. Experiments have shown that this polarization of the ground in the vicinity of strong currents such as those used for electric propulsion extends to almost an unknown distance, and in America there has been a complete stoppage resulting to the working of some of the ocean cables. This is a matter which is likely to disincline Governments to sanction electric tramways, especially in cases when the telegraph or telephone is their property." As we hope Colombo is not to be left much longer without its local tramway system, one which would prove of great service to the residents in a place covering so large an area as your capital city does, it will be as well that this recently discovered objection to the use of electricity upon them should be known and be well-considered when the question of the means of working them is being discussed.
—*London Cor.*

COFFEE IN JAVA.—The opening statement by the Minister of the Colonies to the States-General in Holland is not so cheerful about Netherlands India as could be hoped. The serious failure in the yield of coffee is at the root of all trouble, and will cause a serious deficit in the Government accounts, reckoned at twenty millions of guilders. Nor is the loss only confined to the Government, for the commercial community and the natives feel the situation. It is satisfactory to note that the Government will not have to borrow, however, and that irrigation works and the extension of railways will not be thrown back. They are both to be proceeded with.—*L. and C. Express.*

WET AND DRY.—The Style district of Cumberland is the rainiest in the kingdom, and the Dingwall district of Ross shire the driest. 175 inches a year is the mean fall in the one place; 14·57 is the mean in the other.—*Rod and Gun.* [This statement surprises us; for we had seen it stated that the records of over half-a-century showed that the highest average annual fall of rain was 117 inches on the Cumberland range and that the lowest fall was in Durham, not more than 20 miles due East of the scene of the maximum, and was about 17 inches—ED. *T. A.*]

DISCOLORATION AND OTHER AFFECTIONS OF TEA LEAVES.—It is natural after their experience of coffee that Ceylon planters should be particularly sensitive about any evil appearance in their tea leaves especially when such may recur after an interval and perhaps in the same locality. We hear of nothing of the kind generally, but every now and then we have an inquiry about discolored or punctured leaves which are puzzling to account for and which may look like the beginning of a minor pest. It is, therefore, satisfactory to be able to publish the following letter from the Director of the Royal Botanic Gardens in answer to one such inquiry by a planter living at a medium elevation. Dr. Trimen writes to our friend:—

Peradeniya, Oct. 2nd.

Dear Sir,—In reply to your letter of yesterday, I may say at once that I do not think there is anything seriously the matter with your tea. Such little patches, spots or pimples of unhealthy or dead tissue are very common on nearly all leaves of an evergreen character especially when of some age, and are quite compatible with the good general health of the plant, as they do not materially interfere with the functions of the leaves as a whole.

I notice that the younger leaves you send are scarcely at all affected.

What may be the actual *cause* of the local affection of the leaves I am not able to say, probably some irritation from the presence of minute insects, the scorching of sun after rain, &c.

The condition is, I think, scarcely of sufficient importance to warrant the name of "disease," though such a term is technically justifiable.—Yours faithfully,

HENRY TRIMEN.

THE CHARACTERISTIC INTEMPERANCE OF THE INDIAN CLIMATE—says the *Pioneer* of the 16th ult.,—has been carried so far during the present rainy season that the weather reports land us in the region of paradox. It is the standing objection to India that for eight and a half months in the year it is far too dry, and for the remainder far too wet: but during the present season an unusually large rainfall has been compressed into little more than two months, and complaints of droughts are abroad before the monsoon in the ordinary course should be nearly over. Districts showing far more than the whole of their average annual allowance of rain are already crying out that unless more comes there will be no autumn crops. Districts that were mostly under water in the middle of August are by the middle of September complaining that it will be impossible to sow. Within a month the tone of the Provincial Summary has changed from "a break urgently needed" to "rain urgently needed," and that through every district. The next few days will show how far this urgency has been met by the showers which have come in the nick of time to the Allahabad Division. But Lower Bengal, still more unfortunate, is suffering simultaneously from the effect of both extremes. Through the Burdwan and Chota Nagpur Divisions the winter rice crop is said to be suffering badly from drought, while in other parts of the Province both autumn and winter rice have been apparently destroyed by floods. In Murshidabad, Jessore and Nuddea the damage from this cause is so severe that relief has already become necessary.

PLANTAIN GROWTH AND PLANTAIN FOOD IN AFRICA

are noticed by a writer of reminiscences in the *Pioneer*. Writing of Uganda, he states :—It is a marvellous country in many respects, full of rivulets, banana groves, clustering hamlets and wild fig trees. Whether one approaches it by way of the Nile or from the East Coast route, it is like stepping into a new world to set foot in Uganda, so totally different is it to anything one has met with before. Perhaps the most striking feature to a new-comer is the immense number and size of the plantain trees, which grow in such profusion that he may walk for miles with nothing but the shade of their broad leaves above his head, and nothing to be seen on either side but long vistas of their stems. In one sense this luxuriant growth of plantains may be said to be the curse of the country, for since the Waganda find their food so easily (literally bending down for their acceptance), they never take the trouble to cultivate the soil or to sow cereals, but live in lazy idleness upon the provision so bountifully supplied by Nature. The plantain trees grow to a large size in that humid climate, compared to which those met with in India seem a most degenerate species, the bunch of ripe fruit being as much as a strong man can lift. There were four or five distinct kinds : the ordinary eating banana ; a second kind with a very thick pink stem and long three cornered fruit called "gonja," which they always cooked in hot ashes, when it resembled a roasted apple in flavour ; a third species which bore very small fruit, in taste not unlike jargonelle pears, from which the national drink mwengi was made, and another kind which is never allowed to ripen but invariably cooked in its green stage. This last was the "staff of life" to the Waganda, and as long experience had made them connoisseurs in the art of cooking it, it may prove interesting to describe the operation briefly.

A bunch of fruit is selected whose colour is just commencing to change from green to a tinge of yellow, and the tree from which it hangs is cut down at the root. All the larger and more perfect leaves are then cut off and passed rapidly through the flame of some burning straw or other dry combustible, the centre rib of the leaf being first split up with a knife along its whole length to serve as string afterwards. The action of this flame renders the leaf soft and pliable without injuring its strength and a number of the plantains, carefully peeled and cleaned are then tied up in some of the best and most perfect leaves, the bundle being placed in a large open-mouthed earthenware pot with several pieces of the thick leaf stalk underneath to prevent the bundle touching the bottom of the vessel. About a pint of water is then poured in and a quick fire started underneath, the bundle of plantains being carefully covered over with layer upon layer of the flexible leaves neatly folded up, which both prevent the escape of steam during the process of cooking and serve the purpose of a table-cloth afterwards. If they have meat it is wrapped up in a similar manner, great care being taken that the leaf wrapper has no crack through which the gravy can escape, and deposited in the very centre of the plantain bundle: a rude and perfect imitation (or original ?) of Captain Warren's cooking-pot. When the women judge that the steaming has continued for a sufficient length of time, the top layers of folded leaves are removed from the pot and spread out upon the rush floor : and a most aromatic appetising odour does that smoking table-cloth emit, as I can testify from experience. Then the great bundle of plantains is extracted

and kneaded by the women while still wrapped in leaves, until the mass is of the consistency of mashed potatoes, when the leaf coverings are untied and portions handed round to every guest. The smaller bundle of meat is placed in the centre of the cloth, and each one helps himself to gravy by pressing his thumb into a small ball of plantain mash so as to make a kind of cup, which he dips into the liquid.

A more appetising way of cooking plantains could hardly have been devised, and it is small wonder that the Waganda thought no food could compare with it. In fact they openly asserted that the reason why white men visited their country was because no such trees grew in their own. To them the plantain tree means so much that they entertain an undisguised pity for those whose lot is cast in a country where it does not flourish. It not only supplies them with their daily bread, but gives them ropes to fasten up their fences, napkins to wash and wipe their hands with, dried provisions to take with them on their journeys, and a delicious beverage to drink which is fully equal to cider. The only purpose for which they grow cereals is to start fermentation in this mwengi or country beer, and when the ambassadors were returning from Khartoum they were constantly longing for plantain food, although liberally supplied with wheat, rice, meat and vegetables. Of the merit or demerits of this natural food supply it is difficult to judge. It evidently suited the Waganda, for they were physically well formed and surprisingly intelligent ; but we noticed that they required to eat an enormous quantity of the food to extract the due amount of nourishment, and one result of this was that most of the children (between the ages of four and twelve) were more or less pearshaped about the abdomen. It is very doubtful whether Europeans could subsist for any length of time on such a diet, as the power of assimilating it could probably only be acquired when young : but it only needs the demand for cereals to be created for the supply to be forthcoming, as the soil is rich enough for anything.

THE NORTH BORNEO PEARL FISHERIES.

Several letters having been received lately at Sandakan on the subject of Pearl Fishing on the Borneo coast, the Government have forwarded to the *West Australian* a copy of a letter sent to Messrs. Erickson and Wood, in June, 1888. Information was asked for on their behalf by Capt. Gray, of the "Australind." The following are the chief parts of the letter, and the Government offers to give any further information desired, adding, however, that a permit would not be allowed to interfere with a bank known to and worked by natives.

PEARL SHELLS.—Mother-o'-pearl are found around the coast and island of North Borneo, particularly in the Sulu Seas, where they are fished for by natives in the most primitive way. The shells form one of the most important exports in the Sulu Islands. From time to time pearl banks have been found round Balambangan, Bangney and Malliwalle, and round the Islands of Culibabang Paya and Omadal on the East coast, all included in the territory called British North Borneo, but as yet nothing has been done to discover or develop them, the attention of the Government having been given to opening up the country. The natives of the coast, however, are beginning to give more attention to pearl-shell fishing, and within the past two years pearl-shells have been exported from Darvel Bay. A bank is also known to exist in Marnda Bay. The reason why pearl-fishing in North Borneo has not received more attention, is on account of the reports about pirates ; up to within a few years ago the coast was infested with them. The Batuinis, Illamins, and Bajows were at one time very successful in keep-

ing the coast to themselves. Since the advent of the British North Borneo Company, however, these marauders have had to retire or become peaceful subjects, or suffer the penalty of their misdeeds. At the present moment there is not a pirate in our coast, trade is entirely free, and the Company is entirely free to open up and develop industries on land or by sea. Regarding pearling (I refer to mother o'pearl). Government are prepared to give encouragement and special advantages to pioneers in those industries.

PERMITS AND LICENSES.—A permit or license would be required from the Government, the fee for which would be nominal: a monopoly for a certain time would be granted to the discoverer of new pearl banks.

RULES AND REGULATIONS.—We have no rules or regulations in force, but in the event of the pearl fishing becoming important, rules and regulations such as are in force in Australia would probably be adopted, with the modification necessary to such circumstances.

TARIFF OF IMPORTS AND EXPORTS.—With this letter I am sending you a copy of the *Herald*, official gazette for March, which contains these, together with Harbour, Custom and Quarantine Regulations. It will be observed that the export duty on mother-o'-pearl-shell is 10 per cent. ad valorem. The advalorem duty is calculated on the local value.—*Singapore Free Press*

CEYLON UPCOUNTRY PLANTING REPORT.

Practical Information on "Nutmegs."

NUTMEG CULTURE—MANURING NUTMEGS—NUTMEGS *vs.* CACAO—MODE OF CULTIVATION IN THE LOWCOUNTRY AND ON THE HILLS—YIELD OF HALF-AN-ACRE—INCOME FROM A SINGLE NUTMEG TREE—PRICES IN LONDON FOR NUTMEGS AND MACE.

Oct. 6th.

Periodically, with longer or shorter distances of time between, there is a rage for nutmeg culture in Ceylon. The last "boom" was some six or seven years ago, and there is another "boom" on again. People can get very enthusiastic about the nutmeg, especially during the initial stages; and, having no certain data to go on as to what might be expected in the way of returns, hazard wild enough guesses, touching in some cases, as it did the other day, the munificent figure of R50 a tree! But the man who would grow the nutmeg must be a man with a good stock of patience; and as Europeans in Ceylon are, as a rule, impatient for returns, they are not all suited for the cultivation of this spice. Hence it is that the regularly recurring nutmeg excitement burns itself out long before the tree has had any chance of showing what it really can do; and the plants which had been put out amid great expectations are, after a longer or shorter time thought nothing of and perish from neglect. I can remember of one man who even forestalled this: so disgusted was he with the slow growth of the young plants that he put an end to their existence and his own hopes by pulling—what he called—"the wretched things" up, and closed his experiment in that violent way. Those who know the nutmeg are too well aware that it is not likely to overgrow itself, or hurry into bearing, and the pauses between each recurring pair of new leaves are trying even to a patient spirit. The grower in the old days was afraid to stimulate the plant in any way:—"Manure it, and it dies," was the scientific dictum, believed in and acted up to; and the young nutmeg was left to pick up what nourishment it could from an already worn-out soil. The failure of the nutmegs in the Straits—brought about we were told by high manuring—was what paralysed anything like culture here.

We are getting over this, and the successful experiment in the lowcountry—which is the result of an intelligent patience, and manure applied from the first year of the nutmeg's life—is likely to inaugurate a new era in the production of this valuable spice in Ceylon, and add to the tropical products which the planter may successfully grow, and on which he may depend. We have learnt that the dying out in the Straits was much more likely to have been the effect of the cutting down of the shade and forcing the trees to overbear than the fact that they were well-manured. Even although no special cause can with certainty be assigned for the catastrophe, it must always be remembered that a wave of blight is liable to pass over any product which is extensively cultivated and artificially forced, and that the nutmeg has not been an exception to this rule. It is the waiting for returns which staggers most people, but if one considers how long a cacao plant takes before it is in full bearing—the supplies got up, and everything else in order—the extension of time which the nutmeg demands dwindles into very little. One cacao planter whose place is a credit and has been for a long time in the front rank, told me that it was nearly ten years before his estate had been what he called complete, and the vacancies regularly filled up.

The culture of the nutmeg in the lowcountry differs somewhat from those on the hills, in this way: that in the warm, sweaty, low elevations, shade is demanded. One who has now a good show of nutmegs in a low place, and has given much thought and attention to the growing of the spice, gives me (for the benefit of others who may yet try) the following as the outcome of his experience:—"The plants should be raised from selected seed in nursery beds, and planted out when about one foot high, with a 15-inch 'Scowen's Transplanter,' into holes cut 2 feet deep, and at distances of 25 to 30 feet. They must be at once carefully shaded with cadjans or other suitable shade, and this must be renewed, whenever necessary, until the young nutmegs are about three years old, and the permanent shade trees (*Albizzia molluccana*) sufficiently well grown to shade the ground. The young nutmegs must be kept free from moss and any parasites. Manuring should be commenced when the plants are one year old—the manure spread on the surface and lightly worked in without injuring the under rootlets. When the trees are five or six years old they will blossom, but they will not set fruit until the seventh year and will afterwards yearly increase in production." On the hills the nutmeg wants shade at first but not afterwards; and if the seed is germinated it can be put out after having been duly protected, with a fair prospect of success. To have any kind of decent show of nutmegs one must keep pegging at it, and not count the losses of seed and plants as anything very serious. As to the nutmeg paying, I am in a position to give some figures which may be relied on and which are a rough average of something like fifteen years' returns. The nutmeg grove is a small one, about half-an-acre in extent, contains 58 trees of which 36 are bearers and 22 are males. The trees are planted about 18 ft. apart and are crowding and crushing each other, and the shade below is so dense that no weeds whatever can grow. The trees, I fancy, must be from 35 to 40 years old. The produce from this grove was sold locally, and for the time I refer to, the nutmegs fetched in their *shell* at the rate of 37½ to 50 cents a lb., and the mace R1 a lb. on the spot. The price today is very much better, R1 a hundred for the nuts and R1·25 per lb. for mace, while selected nuts for seed are R2 a 100. It takes from 50 to 80 nutmegs with their shell, on—I don't mean the husk—to make up a pound. The produce of the above half-acre has averaged for these fifteen years about R100, that

is to say, R200 an acre. The cost of cultivation, except keeping down parasites, had been nothing: the crop only had to be gathered. The proportion of male trees is, of course, very excessive; and in a regularly planted place the excess of males would have been wiped out and fresh plants put in. I regret I am not able to get the proportions received from nutmegs and from mace separately, otherwise it would have been a simple matter to have calculated the average yield of each. But the information given above, so far as it goes, is thoroughly reliable.

Here there is nothing so handsome as R50 which has been mentioned to be the income that may be derived from a single nutmeg tree, but, nevertheless, the prospects ahead of the successful nutmeg cultivator are such as to class it among the most profitable tropical cultivations in which one can engage.

The price in the London market for nutmegs and mace is very much higher than obtains here. I have, however, no late circular at hand to quote the figures. Perhaps Mr. Editor, you will kindly supply them. PEPPERCORN.

[We quote from Messrs. Lewis & Peat's fortnightly Circular, Sept. 11th :—

	QUALITY.	QUOTATIONS. 1890.
NUTMEGS, large	...57's a 80's, garbled...	2s 10d to 4s
medium	...83's a 95's ...	2s 8d to 2s 9d
small	...100's a 160's ...	1s 6d to 2s 7½d

—ED. *T. A.*]

A LONDON TEA WAREHOUSE.

(From *Chambers's Journal.*)

It is 8 o'clock of the morning and a numerous body of workmen are passing into the doorway of a huge barrack-like building some half-dozen stories high, occupying the site of a considerable village of London houses which have been swept away to build it. In quiet orderly fashion the morning muster-roll of labour is accomplished, and the gangs of men are told off for work. Steady and well-mannered fellows mostly, but not much resembling ordinary labourers, as currently understood, are these warehouse hands. A most varied lot certainly, with a very general appearance, for the greater part, of artisans out of work, or "down on their luck," as they would say. Indeed, many of them look like anything that could be named in a wide range of choice, not excluding the liberal professions and the gentleman "born."

HOW TEA IS LANDED.

The great ocean steamers are berthed at the various docks as soon as they arrive in the Thames. Their cargoes are discharged at the principal docks, and immediately dispersed over the port of London in vans by land and barges by water, all of which conveyances are jealously crown-locked by the sleepless Customs officials, who watch this fruitful source of revenue from the first "hail" at Gravesend until it is finally deposited, duly paid, in the hands of the consumer. But, primarily, its destination, on being sent from the ship's is the bonded warehouse in town or by river-side, where the warehouse-keeper gives ample security for its safe keeping, alike to the owners thereof and to the Crown as having a lieu on the goods at first hand.

SORTING.

On arrival at the warehouse the tea is pounced upon by gangs of the handy and civil labourers; and, anon, the chests are whirling in mid-air on their way to loop-holes of distant floors near the sky-line, or are being transported thither on men's shoulders in endless streams like human ants, up bewildering flights of stairs to similar far-off stowage. Other gangs, *ad infinitum*, there receive them. Squads of coopers hammer them, prune and hoop them, and otherwise amend them. Drawers of samples pierce and tap them Expert hands carefully assort the multifarious packages into "chop" and "bed," with nice regard to size, quality marks, garden marks—delightfully suggestive these of orient tea-fields—and uniform weight and description. The tea-chests are then ready for the weighing scales, at which Customs officers and warehouse clerks busily ply their pens, entering into account-books the gross and net weights of the goods by each ship, in successive importations, as the packages, are past in swift review before them. Odd things come to light sometimes when the chests are emptied to be weighed for tare and refilled. "Unconsidered trifles" from far-off homes in Assam are occasionally revealed. White rats, dead and flat, have been seen, and bogus chests are not unknown. A frequent importation by the China tea-ships is the delicious fruit lychees in a dried condition.

A CHECK ON ADULTERATION.

But to return to tea. In the history of its progress up to the weighing-point the rigid scrutiny of the revenue officers has been exercised mainly with a view to fiscal and statistical returns; but at this stage of the proceedings the various teas—Kaisons, Capers, Congous, Pekoes, Souchongs, Oolongs, Assams, Hysons, &c.—are inspected by an officer acting as an official analyst under "The Sale of Food and Drugs Act 1875," who selects samples and subjects them to a searching examination, with at times, the wholesome result that spurious or adulterated teas are prevented from entering the British market; and even to the extent of causing such vitiated goods to enter the destruction furnace instead. Large quantities of damaged tea are disposed of in that manner.

A DELECTABLE MIXTURE.

Tea is frequently spoilt on the voyage by salt water or other causes, and, being thus rendered unfit for human food, it becomes "prohibited." It is, however, allowed to be delivered duty-free from the warehouse on condition of its being denaturalised by the effective process of mixing with it a proportion of asafœtida and lime. This delectable compound is used in the manufacture of the alkaloid caffeine.

"BULKING."

For home use the tea from China is generally cleared out of bond in the same condition as on arrival in this country. But Indian tea appears to be so much varied in quality and "make," even when produced in the same tea province, or district that it is found necessary very frequently to throw it together in quantities, taking care not to blend different marks and importations. This arrangement is termed "bulking," and the effect of it is to make the whole bulk of the tea operated on more uniform in appearance and quality. In a large tea warehouse capable of holding perhaps a quarter of a million packages, amounting, it might be, to twenty-five million pounds of tea, the bulking of Indian produce assumed stupendous proportions. Floor after floor will at a busy time be crowded with enormous heaps of the emptied contents of many hundreds of chests. These fragrant mounds are thoroughly "roused" by gangs of men, deft-hand varlets with wooden shovels. A faint and balmy odour fills the rooms, and the atmosphere is heavily charged with a very palpable dust of tea, of dull red hue, which settles upon the clothes like down. The bulked tea is refilled into the original chests and again weighed in the presence of the Crown officers, each empty chest having been previously weighed for tare; the merchant paying duty on the exactly ascertained net weight of the tea.

TEA EXPORTED FROM LONDON.

Immense quantities of tea are annually exported from London, noticeably to Germany and the Baltic Provinces. It is also largely sent to the colonies and to South America. The latter trade is peculiar, the tea being prepared in bond expressly to meet certain native demand. Packets as small as four, or even two, ounces are greatly in vogue. Those goods are frequently also weighed in French kilogrammes (2lb 3oz 5dr.)

Great attention is paid to careful packing for the voyage, and subsequent inland transit; and to elegance of design and pictorial display as to the wrappings and labels embellishing the packets and setting forth the attractive charms of the various judicious blends and mixings. In this particular branch of the trade much latitude is given under the revenue regulations, in bond, as to blending and mixing—practices not allowed to the home trade.

COMPRESSED TEA.

Compressed tea is also occasionally exported from a bonded warehouse. This is tea pressed into brick or cake shape—indubitably tea-cakes! The operation is performed by powerful machinery moving a massive metal disc, which is pierced at regular intervals with oblong holes. Into these moulds the loose tea is poured; and as the iron table slowly revolves, each small parcel is treated in turn to enormous dry pressure from a steel mallet, which infallibly meets the mould with accurate and terrific accord, and squeezes the tea into a solid and shapely lump. In these latter arrangements female labour is greatly employed; the various packing and other arts connected with the system requiring much quick handling of goods and delicate manual skill.

Tea is sold in bond to the dealers by samples which are daily on show; and it is needless to say that the moment the chests leave the warehouse the price paid is enhanced by the fourpence per pound which goes to swell the annual Budget of Her Majesty's Chancellor of the Exchequer. Subsequently, the value is not easily determined. Indeed, it might be said, ethically at least, that it is priceless.

MR. MAXWELL ON COCONUT BEETLES.

The Residen tof Selangor issues the following notification about what he calls cocoa-nut trees; but probably he means coco-nut trees:—

No. 185.—THE COCOANUT-TREE BORER (BEETLE)—Districts Officers are instructed to use their influence with the native owners of cocoanut plantations in order to induce them to clean their trees periodically and rid them of beetles. The palms should be ascended once every month or six weeks. The lowest leaves, if shewing signs of drying up, should be chopped off and the trunk cleared of any old leaf-stumps and of ants'-nests, etc., which the latter may have harboured. At the same time the top shoot should be carefully examined. If they are of a yellowish, sickly colour the beetle is probably the cause. There is no difficulty in finding the hole, as an accumulation of short loose fibre marks the spot. This fibre should be removed and a wooden or metal probe pushed into the hole (one of the side-ribs separated from a frond will answer the purpose.) The beetle is soon transfixed and pulled out. A little sand should be thrown into the hole.

The above is the system employed on the Malabar Coast where the removal of beetle is one of the ordinary routine operations of the cocoanut-growers. A single toddy-drawer will there clean from fifty to one hundred full-grown trees in a day.

The insertion of a little kerosine oil into the hole may be usefully tried. Kerosine oil if mixed with an equal proportion of milk forms an emulsion which can then be diluted with water to any desired extent —*Straits Times.*

CEYLON TEA IN AMERICA:

MR. GRINLINTON'S MISSION AND THE NEW COMPANY.

We have been favoured with the use for publication of the following letter from Mr. Grinlinton to his colleague, Mr. Mitchell:—

S. S. "City of New York," on passage from New York to Liverpool, 491 miles from Queenstown, 22nd September (noon) 1890.

My dear Mitchell,—I last wrote to you on 12th instant from New York, I had at that time accomplished 2,160 miles by rail and had visited Baltimore, Cumberland, Chicago, Bloomington (in the West), and paid flying visits to Philadelphia, Detroit, Buffalo, Niagara, Southampton, 90 miles from New York) and some other places, having made tea, written on tea and on Ceylon products, given private lectures, been interviewed by newspaper correspondents and editors till I was fairly worn out; and some of my relatives who travelled with me (I was always accompanied by some one or more of them) feared I would break down, but I did not, and I am on my way to the mother country as fresh as ever I was, only a little tired, as if I required sleep.

I found the American people most kind and courteous and ever ready to help me, and having been well introduced in every place I could not have been better received. Members of my family, first and second cousins as well as others nearer akin came from all parts (hundreds of miles) to meet me, and I was simply delighted with the country and its people which I saw under the most favourable circumstances. I heard the English language spoken by everyone, and on Sundays I heard our English services in the churches and I felt that I was not in a strange land, but as a visitor to a distant part of our own country. I heard our beloved Queen, our constitution and system of Government spoken of in the highest terms, and the good feeling entertained for the mother country made me feel almost ashamed of the opinions I had at one time entertaned of our American cousins.

Now to business. It took some 8 to 10 days to draw up the needful deeds and papers with a prospectus of the New American Company. After we had settled on all the points, and while the formal clerical work was being attended by the lawyers, I travelled and made our Ceylon products known in many places, so much so that I have been urged to press on our friends in Ceylon to have our little island well represented at the Chicago Exhibition of 1892 and we shall get a good position in the Exhibition I feel sure. Men of business and many others to whom I spoke took a lively interest in our interesting and beautiful island and promised me every help.

On my return to New York on the 11th instant, I had a paper put into my hand which caused me considerable anxiety, as it contained statements which I felt bound to investigate thoroughly, before I could ratify officially what I had agreed to on my arrival. It took me two days to call upon men of business to whom I had taken introductions from Ceylon and from London to obtain their aid in making my enquiries. I left no stone unturned that I could think of, and having consulted some of the best men of the city, I was more than satisfied that the fears entertained by well-intentioned friends who were so good as to place me on my guard were perfectly groundless. One gentleman, to whom special allusion was made by name, came out of the enquiry with flying colours, and what promised to be an ugly blot has proved of service to us in more ways than one. To Messrs. Wattson & Farr I owe a debt of gratitude for having placed everything at my disposal. To all my proposals which were discussed with the new Board and with the Company's solicitor, they gave due weight, and I had the satisfaction of seeing all the important points carried,—more particularly that in respect to the purchase and sale of pure Ceylon tea; the payment out of the funds, before transferring the balance, of interest at 9 per cent from the date of their payments to 30th September (instant) to the old Company's shareholders who continue in the new Company; the continuation of our Ceylon Directors as a Board of Management in Ceylon; the appointment of our Agents and Brokers for the purchase of teas both in Ceylon and in London.

The old shareholders receive two shares for every one hold now.

The legal documents have gone to our agents in London to be handed to me there and I take duplicates with me.

The share scrip has been engraved and is being printed.

The prospectus is being printed and will be advertised probably by this time.

Nothing had been done except the formal registration (which I read with care and approved of) until I arrived at New York, and had the Company not gone on, those signing the memorandum would simply have lost the Registration fees. I think I have now mentioned the principal matters. There are many minor points which I shall reserve for another time. It is no easy matter for a landsman to write in a ship going 20 miles an hour and rolling.

I wired you from New York on 15th inst. to the following purpor :—"Letter derogatory New York parties sent Ceylon. There is no foundation for the report. We have made careful enquiry and the result satisfactory. Sailing 17th. Everything settled and papers signed." My remarks above are in explanation of this telegram.

It is with great pleasure I mention the name of Mr. Pineo, whose exertions are beyond all I expected. He has been unremitting in his endeavours to place Ceylon tea. Everyone speaks of him as the right man to be placed at New York, and many people have mentioned him to me as most obliging and attentive to everyone seeking information. Consequent on the new start given to matters in America and to Mr. Pineo's exertions, large orders with credits to enable you to draw in cash for the shipments have been sent you. Mr. Pineo has been of the greatest assistance to me, and I feel assured that no one could have shown more zeal in pushing our largest Ceylon industry in the new world. It is only common justice to say this of Mr. Pineo.

We have no idea in Ceylon of the efforts needed in such a vast country as America to push an industry like our Ceylon tea. Our little paid-up capital (some R80,000) would have disappeared within the next 12 months. The movement now on foot is to obtain shareholders everywhere—in every city, town and large village; and to do this Messrs. Wattson & Farr will have to distribute a vast number of shares by giving such shareholders as *will work for the Company*, in placing Ceylon tea in the several towns and villages, an additional share for every share they take and pay for. Very large sums will also have to be paid for advertisements, &c. Not a cent is to go into the pocket of any men out of the capital raised in cash, nor for any purpose until the *whole* of the *cash* capital (200,000 dollars) has been raised and placed in the Treasury. A bond has been executed between the New York Directors to this effect.

You will be glad to hear that I have met Mr. Lipton first at Chicago and secondly at New York, and I am greatly indebted to him for kindness and attention and for the valuable hints and information given me. I cannot write too highly of all he did for me. He took a personal interest in everything. It is quite wonderful what he is doing in Chicago. I saw a property which he had just purchased for *200,000* dollars and had paid for it in hard cash. He is a very wellknown man in New York and Chicago, and his command of capital enables him to make good purchases. I went over his cattle yard and packing warehouses.

We expect to arrive at Queenstown at 1 p.m. tomorrow, and at Liverpool at 7 on the morning of the 24th. We are having a race with the Star Liner "Teutonic" which left New York half-an-hour after us. The two vessels kept in sight for 2 days and were then lost in a fog. We think we see the smoke from her funnels now, but we are not sure. It is most exciting. The "City of New York" beat the "Teutonic" on her last voyage home by 2¼ hours—but the "Teutonic" was first in on the last outward voyage to New York by 3 hours. This present voyage will pull the thing off, and whoever wins will carry the American Mails next time. The "City of New York" is a splendid ship of 10,500 tons gross. Her accommodation is simply magnificent, with a flush deck throughout. She is just a floating palace.

I must now close; and with all good wishes from yours sincerely, J. J. GRINLINTON.

P. S.—I hope to leave London about the 16th Oct. via France and Italy for Naples and to embark there on 25th October on the "Khedive" for Ceylon. I can hardly write, the vessel is rolling heavily. I have backed our opinion (*i. e.* yours and mine) by taking £200 sterling worth of new shares for each of us in the New American Tea Company. You will recollect that you authorized me to do for you whatever I was prepared to do for myself. I hope some of our Company's Directors in Ceylon will take some new shares; also many of our old shareholders. I omitted to mention that when at New York Mr. Wattson (who was at Philadelphia) spoke to me direct through the telephone to Messrs. Wattson & Farr's office, a distance of 100 miles, so distinctly that his voice was clear and he heard my reply equally distinctly.—J. J. G.

TOBACCO IN DELI (SUMATRA), AND CEYLON.

The S. S. "Peshawur" has brought us a visitor in Mr. Chas. Kitchin, Tobacco planter of Deli, who has come across to see what prospect there may be of taking up or extending the cultivation in Ceylon. Naturally, Mr. Kitchin wished to know about the land in the Eastern Province, but he considers a country liable to protracted drought as useless for his purpose ; nor does he believe in irrigation for a European's plantation. The expense over a considerable area would be prohibitory, and yet the margin for expenditure is very great. For, in answer to our mention of the lucky hit made in Dumbara when R800 an acre return from 50 acres was got in one year, Mr. Kitchin remarked that two or three times that amount is not uncommonly got in Sumatra. Of course, there are good and bad estates there—some wonderfully profitable up to 150 per cent per annum and some barely paying their way. This year has been a very profitable one through the high prices paid in Amsterdam, and also for Deli tobacco to go to America where its fine quality is greatly appreciated. Manilla has been, in this respect, quite superseded by Sumatra.—Mr. Kitchin considers it very important that fine tobacco should be guarded from deterioration. He thinks that a great drawback to Europeans opening plantations in India is the great inferiority and yet abundance of the native tobacco. But the cheapness of labour here and in India is an immense advantage over Sumatra where sometimes R20,000 are spent in trying to secure 100 labourers. Mr. Kitchin is to run upcountry: he will probably visit Matale and Dumbara and we bespeak for him planting attention during his visit to the districts.

COLONIAL-GROWN TOBACCO COMPETITION.

The following is the report of the Judges in the Tobacco Prize Competition:—

In making their award the judges have had a due regard to the conditions under which the prize was originally offered by the Section, the principal of which were (1) that specimens submitted for competition should amount to not less than 400 lb. in weight, grown on a commercial scale ; (2) that each sample should consist of an average of the growth ; (3) that the name of the grower, the locality, and total quantity of the growth should be stated ; (4) and that the care bestowed on the handling, sorting, and packing of the tobacco for commercial purposes, should be taken into consideration. With the consent of the Section the competition was kept open more than two months beyond December 1, 1888—the date originally appointed for determining the same—in the hope that additional specimens would be forthcoming from the Colonies and India. The judges regret, however, that their anticipations were not

realised, and, consequently, they have only had to report on the three specimens from North Borneo, the West Indies, and the East Indies, which had been entered prior to the extension of time being granted.

These three entries were duly inspected by the judges on February 18th, 1889, at the Fenchurch Street warehouse, and their award was agreed upon; at a subsequent meeting after they had had an opportunity of comparing the merits of the North Borneo and West Indian tobacco—from which samples were drawn for manufacture into cigars. The East Indian tobacco, as stated below, was only suitable for cutting purposes, and hardly entered into competition with the others.

The judges much regret that through inadvertence a sample of East Indian tobacco, marked L B X and T F 782, was not brought under their notice; but they have added (Appendix B) a report by Messrs. Grant, Chambers and Co., of 37, Fenchurch Street, on its commercial qualities, which was drawn up some time subsequent to their inspection of the three exhibits mentioned in the foregoing paragraph.

Some difficulty was experienced by the judges in arriving at a decision, owing to the varying characteristics of the tobaccos submitted to them, and opinions being nearly equally balanced in favour of the West Indian and North Borneo specimens—which were comparable as cigar tobaccos—they decided to recommend to the Section that the prize of fifty guineas should be divided between the growers of the two specimens.

The judges are much indebted to Dr. Bell, of Somerset House, for his analysis of the specimens submitted to competition, which they append to this report.

Subjoined are particulars as to the cultivation and preparation furnished by the growers, and our remarks on the tobacco sent in for competition:

1. West Indian Tobacco (445 lb.). Grown by Señor Nicanor Moreno, box 80, Kingston, Jamaica. This parcel, in two cases, was grown from Havana seed, on an estate at Airy Castle, St. Andrew, the total quantity of the crop being 2,500, lb., and the approximate yield per acre about 600 lb. The cost of production for the whole is stated at from 60s. to 80s. per 100 lb., and the grower explains that 'on account of dry weather the produce was not half of what it should have been.' The entry was made by Messrs. B. and J. B, Machado, of Kingston, Jamaica, who point out, with reference to the two cases, that the first contained about 200 lb. ratoon tobacco or second cut, viz., first and second fillers mixed, and that the second included about 245 lb. of first cut, mostly first and second wrappers. At the top of the latter, however, there were also about 50 lb. of fillers as a fair sample of the first cut. The method of assorting adopted, it was explained, was due to the fact that the tobacco was not intended for exportation, but only for use in Messrs. Machado's factory. These points were duly brought under the notice of the judges.

Remarks of the Judges.—In some important respects, this tobacco most fully complied with the conditions of the competition. Its general appearance was good, and it was of a uniformly dark brown colour. The leaves were fine and clear, there were some white veins, and about 18 per cent. of stalk. Viewed commercially, the tobacco was more suitable for fillers than for covers, the leaves being comparatively small, and consequently not very productive for wrapping purposes. The flavour was good, but too strong for the English market, and more suited for Continental consumption. The tobacco burned well, though slowly, and did not hold the fire as satisfactorily as the Borneo; but if matured it would improve in burning. For blending with Cuba, Brazilian and Havana, it was specially suitable. The samples submitted apparently embraced all the classifications in the crop, thereby satisfying the conditions of the competition. They possessed some resemblance to some sorts of Havana, and for certain qualities justified the opinion that parts of Jamaica are well adapted for raising the finer kinds of tobacco. In the Island of Cuba only some limited districts produce the more valuable descriptions, and similar selected places probably exist in other islands of the same group.

2. British North Borneo Tobacco (533 lb).—Grown by Mr. P. Persyn, Panow Estate of the Borneo Tabac Maatschappy Kudat, British North Borneo. This parcel, in three bales, was grown from Sumatra (Deli) seed on the Ranow Estate, the total quantity produced being 58,600 lb., and the approximate yield per acre 1,100 lb. The entry was made by the British North Borneo Company.

Remarks of the Judges.—Taking the three bales as a whole, the leaf naturally resembled Sumatra tobacco; the colour varied from medium brown to light brown, and there were some unripe spots; the veins were hard and wiry, but the leaf was thin, silky and tender. The proportion of stalk was about 16 per cent. Commercially considered this tobacco was the most valuable submitted to the judges, on account of its productiveness; and suitability for cigar covers. According to one estimate, about one pound, if carefully worked, would be sufficient to cover about 450 middle-size cigars. Made up into cigars by itself, the flavour of the tobacco was pungent; neutralised by mixture with other tobacco, so as to overcome the Sumatra flavour, it would probably be better liked. Generally speaking, however, it lacked the rich aroma peculiar to the finer classes of West Indian tobacco. The burning qualities of the leaf were good, there being a clean ash, and cigars made from average samples kept alight for at least five minutes. The specimens submitted were part of a large consignment, and apparently did not represent all the classifications of the crop, and for this reason the judges have not been able to form an opinion on the merits of the entire growth.

3. East Indian Tobacco (514 lb.).—Grown by the Superintendent of the Government Tobacco Farm, Ghazeepore, Bengal, of which Messrs. Begg, Sutherland and Co., of Cawnpore (Begg, Dunlop and Co., London), are the lessees. The sample weighed 1,133 lb., and it was one of 91 hogsheads shipped for sale to the United Kingdom, and not put up specially for the competition. The tobacco was raised from 'Pryor' seed, and about 60 tons were produced. Messrs. Geo. D. Wishart and Co., of Liverpool, who made the entry, believe the hogshead to be 'a fair representative sample' of the entire growth, and state that 'for some years past the produce has shown steady progression especially in the handling and curing. Only at the last minute did we decide to enter this competition, and we regret that we are unable to give any exact details as to the total quantity grown, or cost of production. The quantity shipped, however, shows that the tobacco is grown on a considerable scale, and that it has passed the experimental stage.'

Remarks of the Judges.—This tobacco was only suitable for cutting purposes, and of a common quality. The leaf was coarse, though bright, and the stalks large. Nevertheless, the strength of the leaf pointed to the capabilities of the soil on which it was grown for the cultivation of tobacco suitable for the pipe, provided there is a judicious selection of seed and the conditions of scientific culture are observed. The tobacco submitted resembled the lower American grades; in fact, with proper cultivation, it would be a good substitute for such kinds in the event of any stoppage in the supplies from the United States. It was estimated that in its then state the tobacco would be worth in the English market about 3d. per lb., and perhaps more to buyers requiring it, on account of its colour for blending with other varieties. The fact that during the American war large quantities of tobacco grown from American seed were imported from the East Indies should be some encouragement to growers there.

General Observations.

In conclusion we have to repeat our expression of regret that the prize offered by the Section has failed in its object to stimulate further attempts to develop a lucrative branch of production in the British colonies and possessions. This is the more to be regretted, because, in the great varieties of climate and

soil embraced in those localities—so many of them in sub-tropical situations favourable to growth of the finer descriptions of tobacco—there is an element of successful cultivation which has not been utilized, as yet, to any extent.

It might certainly have been expected that the offer of a prize for a competition of this kind could not fail to draw more attention to the possible capabilities of our dependencies in this direction. Every effort has been made since the conditions were decided upon to bring them under the notice of Colonial and Indian growers, and we are informed that numerous communications on the subject have passed between the London Chamber, Colonial Government representatives and individuals. Yet the result, as we have already pointed out, has been confined to three entries.

It can hardly be thought likely that in both hemispheres with few exceptions, the only places where fine tobacco can be grown are those inhabited by the Spanish race. We think it more reasonable to conclude that intelligently conducted trials would have led to the discovery in the British colonies and possessions equally well adapted for the purpose as any in the Spanish or Dutch possessions.

(Signed) WILLIAM HENRY WILLS,
(Chairman of Committee of Judges).

Appendix A.

ANALYSIS OF SAMPLES OF UNMANUFACTURED TOBACCO DRAWN FROM SPECIMENS SUBMITTED FOR COMPETITION.

			Moisture.	Ash in dried.
Borneo	A.	...	18·94	27·12
"	B.	...	19·65	22·45
"	C.	...	19·50	22·37
East Indian	D.	...	12·79	24·38
West Indian	E.	...	24·87	21·60
"	F.	...	23·51	30·09
"	G.	...	20·67	21·67

ANALYSIS OF TOBACCOS ALREADY IN THE MARKET.

		Ash in Dry Tobacco.
Kentucky (common) ...	...	20·27
Connecticut (seed leaf)	...	25·74
Java (cutting) ...	...	28·06
German	...	25·97
Dutch (fillers) ...	...	22·12
Sumatra	...	20·44
Java (good)	...	21·95
" (common) ...	...	25·07
Seed leaf (fillers) ...	...	29·88

Appendix B.

EAST INDIAN TOBACCO.—Grown by Mr. H. Cain, Superintendent of the Government Tobacco Farm, Port Blair, Andaman Islands. The sample weighed about 514 lb. nett, the tobacco being raised from Virginia seed on the Government farm, and the total crop being 3,000 lb.

Report on one Hogshead of Tobacco.

EXAMINED FOR THE LONDON CHAMBER OF COMMERCE.

MANIFEST MK.	LANDING MK.
LB	No.
X	TF 782

Remarks.—Small part leafy, but rather narrow for the length, large part short and more or less blistered throughout, very imperfect, and with large bare stalks and butts attached. This tobacco in its present state has the general appearance of being only partially fermented, and will not hold fire, and has little or no flavour of tobacco. As a whole, it is not of such a character (in its present condition) to be an article that would meet a ready sale, except at an extremely low price.

GRANT, CHAMBERS & Co.,
37, Fenchurch Street.

London, November 15, 1889.
—*Tobacco.*

OUR REVIEWER.

ENGLISH VEGETABLES AND FLOWERS IN INDIA AND CEYLON*

Is the title of a very complete and valuable Manual, compiled from authentic sources by Donald McDonald. It is a square volume of 60 pages, good toned paper and clear type, and gives directions easy for an amateur to understand and to follow. In the introduction the writer shows how great the influence of Europeans in India has been in developing among the educated natives a taste for flowers and for gardening, and speaks of the help afforded through various Government Botanic Gardens, to those who are establishing a garden. The 1st chapter treats of "The Climates and Physical Features of India," and regards that land as having three distinct climates, those of Northern, Central and Southern India. The 2nd chapter is on "The Soils of India," the 3rd on "The Formation of the Garden," *giving* directions as to the slope, shape, preparation and drainage of beds, with quotations from various authorities. Then follows a very complete table showing "The proper months to sow and plant English vegetables in the Plains"; fifty-seven different vegetables are tabulated, and opposite to them we find the months marked when they should be sown on high and on low-lying lands. Next we have "Monthly reminders for cultivating English vegetables and flowers in the Plains." Thus we find "March in the Vegetable Garden," "March in the Flower Garden," and under each heading you have directions for Northern, Central and Southern India respectively. We will quote by way of illustration the directions for March in Southern India:—

"The great heat generally prevailing at this season prevents much sowing or planting being done, therefore pay attention to trenching, digging, and ridging up ground. In commencing to subsoil or trench a piece of ground, let an opening be formed, of two feet or twenty inches in breadth, to the full depth of the surface or active soil, and the entire length of the bed, and let the stuff be removed and left at the opposite side, in order to have it to fill up the last opening, when the ground or bed will have been entirely turned over. Let the subsoil, to the depth of a foot or fifteen inches, be loosened and well broken, with a pick or spade; but let none of it *now* be brought to the surface. A second trench must now be marked out, the same breadth as the first, and the surface sod of it turned over on the broken subsoil (upside down), and finished off in the form of a small ridge or drill. The subsoil in the second opening is now loosened and broken as the first, and a third line or opening marked out, the surface sod of which is turned over on the broken subsoil of the second, and finished off in the form of a drill, like the first, and so on to the end. The ground can be manured as the work is being carried on; but the manure should not be laid on the bottom nor on the surface, but in the middle of the drill, between the first and second spits, or between the digging and shovelling. Ridged up or drilled in this form, let it remain to pulverize, and there will be very little trouble in levelling it down for cropping in the proper season. At each succeeding digging a portion of the broken subsoil should be turned up and well incorporated with the surface soil; and by repeated digging, and taking up the subsoil in regulated proportions (not more than an inch or two of it at a time), the texture of the entire mass will be changed from a poor sterile, to a rich, fertile soil. This is the true method of deepening and enriching the soil, which, with effectual drainage, is certainly the best preparation to ensure good crops in the garden; and should be attentively studied and industriously persevered in."

* To be obtained at the *Observer* Office. Price: cloth covers, cash R4·50, credit R5; in paper covers cash R2·50, credit R3; Postage 10c.

Then we have a table of "Average Seasons at various places." Next, a chapter on "English Vegetables, the best sorts to grow and quantities to sow." Concerning "Carrots," for instance, they tell you:—

"One ounce will sow a row 100 feet long and twelve inches apart; thin out to six inches from plant to plant. Mix the seed with moist sand the day before sowing. The best sorts are Early Summer Favorites, the new Scarlet Perfection, Intermediate, Early Horn, and White Belgian."

Or concerning Tomato:—

"One ounce will give about 800 plants. Sow in boxes, and transplant to three feet apart. As they mature, cut out all superfluous growth to expose the fruit to the sun. Such varieties as the Smooth Perfection, Dedham Favourite, Holborn Ruby, and Golden Gem, give marvellous returns of the most delicious fruits in most parts of India. The plants will require support unless against a fence or wall. A plan that might be tried with success in India is the placing of a piece of trellis shaped thus ∧ over the plants, push the growth through it, and let the flowers and fruit lay on the top. The foliage will assist in keeping the roots shaded and cool, while the fruit will get the full benefit of the sun. It is a great mistake to feed them too much at the earlier stages of growth. They will set their fruits more freely on pure water and good garden soil, if a start is given them in something richer, and repeated when the fruit is forming."

The remaining chapters are headed "Hill Stations, Garden Cultivation in Upper India; Notes on Ceylon; English Flowers from Seed; Popular English Flowers, including shrubs and other plants that do well in India; & Select List of Foliage Plants for subtropical gardening (all of which can be grown from seed); The Rose; English Bulbs; English Fruits; On Manures, Watering, Vermin, &c.; Average Rainfall at various places; English Seeds and how to treat them; Average Altitudes at which various trees grow in India; The Rotation of Crops in the Vegetable Garden (a table)."

The list of Popular English Flowers includes 113 names, and the descriptions run somewhat as follows:—

"COCKSCOMB:—A variety of the Celosia, ranging in colour from bright yellow to deep crimson. Sow in pots and transplant singly as soon as large enough to handle; repot as required, and keep the plant well fed, and with plenty of root room. The fine Empress variety produces combs of colossal proportions. The plumosa varieties can be bedded out.

"*Sow in the Hills, March to May*; *in the* plains everywhere, *June to September.*"

INSECT PESTS AND REMEDY.

Although the following is properly an Advertisement, we quote it into the *Tropical Agriculturist*, as the information may be useful to our readers:—

CASPER SCHNEIDER'S ARSENITE OF AMMONIA. U. S. PATENT. PREVENTS DAMAGE OR DESTRUCTION TO COTTON PLANTS AND ALL OTHER CROPS OR DELICATE PLANTS BY INSECTS, &C.

Distinctly superior, more convenient and considerably cheaper than Paris Green.

Stapleton, N. Y., April 5, 1890.

Gentlemen.—On the 11th Day of February 1890, I obtained from the U. S. Patent Office a patent for a Substitute for Paris Green which I have named "Arsenite of Ammonia." It is designed for all those uses on the Plantation, Farm, and Garden to which Paris Green is now applied; and it has been adjudged decidedly superior to the latter article by farmers in all parts of the country who have tested in with the most satisfactory results. With their letters of commendation before me, I have no hesitation in introducing it to the public at large.

A few of the advantages I claim for Arsenite of Ammonia over Paris Green are as follows:—Being a fluid, it will raise no dust and is entirely free from sediment when dried out. It is particularly beneficial to Cotton Plants, but is also decidedly superior to Paris Green for use on fruit-trees, currant-bushes, grape vines, and general garden truck. Having no sediment it will not, like Paris Green, leave a deposit on the plants to which it is applied that will retard their growth. On the contrary, plants treated with this solution are of quicker growth and of decidedly improved appearance.

It will enter into every crevice of the plant—which cannot be said of Paris Green: at the same time it is not necessary to saturate the surrounding ground.

DIRECTIONS.—To an ordinary pailful of water take one large tablespoonful of the solution. Mix and apply with an ordinary Sprinkler, or hand pump, or even with a small broom. In the case of cabbage plants, care must be taken to apply the mixture before they close or form the head. As a general rule one application will be found sufficient to destroy all insects and germs.

In using large quantities it requires no more of the Arsenite of Ammonia than of Paris Green, that is to say, where one pound of Paris Green would be required, take one pound of my substitute and secure sure results.

The experience of those agriculturists who have put my invention to a practical test warrants me in claiming for it:

1st. That it is more convenient to use than Paris Green.

2nd. That its effects are more satisfactory.

3rd. That, unlike Paris Green, positively no injurious results can come from its proper use.

4th. That it is considerably cheaper.

With my fifty-five years' experience in this line I am known all over the world as a reliable Chemist and the oldest manufacturer of Paris Green in the Country. My goods have the reputation of being the best made anywhere. I know the danger of using Paris Green on Plants etc. for the destruction of insects and have been experimenting for years to find an article equally as effective but not so dangerous: and I am fully convinced that in offering to the Public my new invention Arsenite of Ammonia, I offer an article that is sure to give entire satisfaction to all who use it.

Hoping you will give the circular your kind attention.

I remain, yours very respectfully,

CASPAR SCHNEIDER, Chemical Works.

Sole Agency: Fr. Jac. Andres, 25 Pearl Street, New York.

—Quotations on application.—

Prof. Charles Ripley of the U. S. Department of Agriculture writes:—

"If your mixture is valuable for the cotton worms, it will be also useful for many other insects."

He has instructed me to ship a Keg each to several agents of the Division of Entomology in U. S. who are now experimenting with it.

Arsenite of Ammonia has also been found useful on potato fields and other purposes, and the following are copies of letters received:

1. I have tasted your insecticide on my potato plants with very good results, as compared with Paris Green. A single application of your compound upon several rows of plants killed all the bugs in one night. Adjacent rows of plants were treated with Paris Green, and as the first application had no perceptible effect upon the plants, a second dose had to be applied, which had the effect of killing the bugs, but had a perceptible had effect on the plants; while your compound had a decidedly beneficial effect upon them.

2. I hereby thank you for the bottle of your Arsenite of Ammonia you gave me as an exterminator of potato bugs and other vermin; it has been the best remedy I have ever used.

3. I have used your Arsenite of Ammonia on my rosebushes according to your directions, and found that even half the quantity will be sufficient; it killed all the bugs almost instantly, I found them dead under the bushes.

Correspondence.

To the Editor.

TEA-DRYING—THE BLACKMAN SYSTEM.

Dear Sir,—I believe the "Blackman Air Propeller" has been introduced on one or two estates. Would the managers of such estates kindly favor your readers with their opinions of it and what alteration, if any, is required in an ordinary withering loft to work it successfully? S. A.

FURTHER INFORMATION WANTED ABOUT A NEW FOREST CLEARER.

Dear Sir,—The March number of the 9th vol. of the *Tropical Agriculturist* contains at page 642 an article headed "A New Forest Clearer." Does any of the numerous readers of the periodical know anything more about the invention, or is the whole simply a humbug? By all means the information is not taken from an American paper.

For any informations in the *T. A.* which may lead to know more about the matter, eventually to get at the composition will be very thankful one who is about to become on a large scale a forest clearer.—Yours truly, EUGENE KASSEL.

A PROLIFIC COTTON TREE.

P. W. Bungalow, Delmar Estate, Sept. 20th.

Dear Sir,—In one month—20th August to 17th Sept.—I collected from one tree 7 oz. cotton, the seed 15½ oz. There has been no rain for some time; the tree is not at all a fine tree. I had to cut a large piece about 3 feet off, it was so overweighted with pods, and had been neglected. I would like to know what quantity of oil can be got from 1 cwt. seed; also poonac, and their value and use.—Yours faithfully, JAMES ROBERTSON.

P.S.—The same cotton as I sent you—"kidney" or "Pernamtbuco"—I gave a good number of this seed to the Hon. J. Grinlinton. I would like to see a deal of information given about this sort, for I feel sure it is the proper kind for Ceylon, if some fresh seed could be imported. [We commend this letter to the special notice of the Secretaries to the Cotton Spinning Company.—Ed. *T. A.*]

LIBERIAN COFFEE &c. IN JAVA.

Pussellawa, September 23rd.

Dear Sir,—I send you a translation of the conclusion of what seems to me a very interesting amount of Liberian coffee in Java—where according to Mr. H. J. Wigman it is to play a conspicuous part. There is in the same number an article on the production of camphor in West India by Dr. M. Greshoff which I think worth publishing.—Yours truly, JOHN DENT YOUNG.

"*Liberian Coffee.*

"At the present time, the cultivation of Liberan coffee is being extended with great energy in the subdivision of Buitenzorg alone. Tehre has to my knowledge, already been an extent of over 3,000 acres those cultivated and there is still an immense extent of land in the lower districts, now lying waste, which can by suitable culture be converted into productive coffee estates."

The above is the concluding portion of an interesting article by Mr. H. J. Wigman in the 5th No. of the "Teysmannia." The article contains an account of the Republic of Liberia, and in my opinion is of much interest. Shall I send you a translation of the whole? How beautifully got up is the "Teysmannia"—paper, type and all well worthy of the countrymen of Laurens Koster. As far as I can learn the name of the work is adopted from the name of a botanist called Teysman, with a Latin termination.

[We shall be glad to have translation of both articles for our *Tropical Agriculturist.*—Ed. *T. A.*]

THE STAMPING-OUT OF CATTLE MURRAIN

Belgravia, Sept. 23rd.

Dear Mr. Editor,—If not too late, in reply to your excellent editorials, beginning in your issue of 5th August last, evidently called out by your correspondent "Truth"'s remarks on cattle disease and its prevalence and causes, I agree with every word "Truth" says, and would if able say far more and severe things regarding *those* who have so long stood aside and allowed murrain period after period to sweep over the land, kill out its herds, impoverish the poor cultivators and bring them by many thousands to misery, want and ruin.

I at least am convinced, after an experience of more than 30 years, and maybe with better opportunities than many, while at the same time my early training fitted me to see and appreciate, and watch the progress of disease during this long period;—I now say no more fruitful cause of poverty prevails among the native cultivators of the soil than that of cattle murrain, call it by what name you may. Cattle are the chief wealth of the rice cultivator, while they are the mainstay of the numerous cart drivers and tavalam men.

The *cry* of improvement of the breeds, of their degeneracy, of better housing and feeding are all to me mere surplusage. The better you breed, the more you feed, the more you lay your herds open to contagion, as long as the disease is allowed to go rampant over the land.

It has ever been, in the matter of cattle here, "a survival of the fittest." Hardy and untended, a remnant has always escaped, and pray who but a madman would go to any expense to improve stock, without the security of a single month's freedom from the ravages of disease let loose on him at any moment and at any point of his surroundings?

Your valuable discussion of the whole question has not, in my opinion, improved the condition of things one *iota*. Strike at the roots of the evil, "suppress the disease," and render it manageable and then *think of improving, feeding and housing*; and not till then. I shall in another article follow all your reasoning so well and full and exhaustively done; yet you have not touched on the main cause of all the evil at least with a practical suggestion.

You represent me as "bloodthirsty," standing with a poleaxe ready to destroy half the cattle in Ceylon. You quite misunderstand me. I no more want the disease to gain a footing than does our admirable C. M. staff *in re* cholera when it appears. W. S.

[By all means let us hear our correspondent's scheme for stamping out murrain. No one would more heartily rejoice at the success of such a scheme than we. The difficulty is that here in Ceylon, as in continental India, rinderpest is not merely an occasionally imported pest, but an indigene of the land, lurking in the byplaces of bad shelter and insufficient food and every now and again vivifying into virulence. If the Madras Government has failed to extirpate the evil, we fear we cannot be much more successful. But let us have our correspondent's remedy for what is, confessedly, one of the greatest of evils.—Ed. *T. A.*]

A FEW TEA NOTES.

SIR,—Some little time ago there was a discussion between tea planters and tea buyers, many of the former asserting that they do not get full value of teas sold at the weekly auctions, and in consequence ship direct to London. On the other hand tea buyers maintain they have orders from various parts of the globe which it is impossible to fill, even though they are prepared to pay more than the London valuations. There is no doubt whatever that much business from foreign countries, formerly passing through London, is now coming direct to Colombo, but if these orders cannot be promptly fulfilled they will again revert to Mincing Lane to the detriment of local firms and the growers themselves. I cannot by any means agree with the latter as to the local market not being so good as Mincing Lane. There may be exceptional cases where monies have realized higher prices at home, but in the long run I feel sure planters will benefit by supporting the local sale room. It is well-known by Colombo tea men that large sums have been dropped by buyers at local sales who have resold in Mincing Lane. Many firms have bought tea as a speculation, or as a form of remittance hoping to save something in exchange, and those who study the Mincing Lane Circulars can see that losses have been made to the extent of even 5d per lb. Of course where they have private outlets they come out alright, but I think I can safely say, that those who have bought teas here and sold at London auctions have lost money somewhat heavily, taking the year all round. On an upward market they may now "score" for a time, but as a rule any upward tendency is fully discounted in Colombo, as witness recent sales.

I know of two cases where local firms have received foreign orders for particular brands. In one case the sellers wanted over a rupee per lb. for that which has only been fetching about 10d per lb. in Mincing Lane. In the other instance the difference was not so marked, yet quite sufficient to prevent the order being placed in Ceylon. In both these cases the orders will revert to London, so that the planters will lose a good market and the merchants their commission.

It follows, therefore, that those planters availing themselves of the services of local brokers have invariably reaped higher prices for their teas through the spirit of speculation or competition amongst buyers in Colombo, than they would have done had they themselves speculated by shipping their produce to a market 6,000 miles away.

UPIDU.

INDIAN TEA EXPORTS.

Indian Tea Association, Calcutta, Oct. 11th.

DEAR SIRS,—The General Committee have the pleasure to hand you their usual Monthly Return of shipments of tea from Calcutta, and also a Return of Exports of Ceylon Tea for four years up to the 18th September 1890.

EXPORTS OF INDIAN TEA FROM CALCUTTA.

	1890	1889	1888
	lb.	lb.	lb.
Exports to Great Britain in Sept.	14,263,059	16,253,978	12,188,328
Exports to Great Britain from 1st May to 30th Sept.	40,416,251	40,761,934	40,025,482
Exports to Australia and New Zealand in Sept. ...	712,200	806,863	495,061
Exports to Australia and New Zealand from 1st May to 30th Sept. ...	2,293,446	1,807,392	1,344,564
Exports to America in Sept.	25,837	23,596	19,990
Exports to America from 1st May to 30th Sept. ...	62,072	90,847	63,119
Exports to other places in Sept.	195,095	154,311	158,867
Exports to other places from 1st May to 30th Sept.	526,277	1,061,604	464,217
Total Exports from 1st May to 30th Sept. ...	43,297,046	43,721,777	41,897,382

—Yours faithfully, S. E. J. CLARKE, Secretary.

RUTHERFORD'S AND STREET'S TEA TABLES.

Oct. 1st.

SIR,—Attention having been called in your columns to the alleged incorrectness of Mr. Rutherford's figures, I have taken the trouble to compare them with those of Mr. Street, and I must confess that I am somewhat mystified as to the manner the calculations have been made: they do not appear to agree with each other at all, and both are at variance with the *true* equivalents in Ceylon currency—for instance, in *Rutherford's Tables* it is stated that at

London price. per lb.	Exchange rates.	Equivalent in Colombo. Cents.
1s 4d	1s 2d	101
1s 4½d	1s 2½d	100·50
1s 5d	1s 3d	100
1s 5½d	1s 3½d	99
1s 6d	1s 4d	100
1s 6½d	1s 4½d	100
1s 7d	1s 5d	100
1s 7½d	1s 5½d	101
1s 8d	1s 6d	100
1s 8½d	1s 6½d	99·50
4s 9d	1s 7d	100

Clearly if we take off the 2d per lb. (allowed for by Mr. Rutherford for freight insurance charges) from the London prices for tea mentioned above we have figures remaining exactly the same as the rates of exchange placed alongside them, and the result must, of course, in *each* of the above instances, be neither more nor less than 100 cents (by taking off 19 cents allowed to buyers of leaf and dividing the result by 4 the *correct* price of green leaf as calculated by Rutherford is arrived at.) In Mr. Street's tables it is stated that

Colombo price	Exchange rates s d	Laying down cost in London per lb. in pence.
100	1 2	1s 4·61d
100	1 2½	1s 5·16d
100	1 3	1s 5·74d
100	2 3½	1s 6·28d
100	1 4	1s 6·83d
100	1 4½	1s 7·40d
100	1 5	1s 7·94d
100	1 5½	1s 8·50d
100	1 6	1s 9·05d
100	1 6½	1s 9·63d
100	1 7	1s 10·17d

The differences between Mr. Street's "laying down cost in pence in London" of the above as compared with Mr. Rutherford's system of *always* calculating 2d per lb. to cover *all* London charges for freight, insurances, selling, commissions, &c., &c. (and which is a very convenient plan, for he gives at foot of his tables the cost equivalents of *each farthing* of these charges, under each rate of exchange so that with low freights or high freights, the exact calculation can always be readily arrived at whenever London charges amount to more or less than 2d per lb.) is very considerable, thus—by Mr. Ruther-

ford's *system* (*not* his figures ! !) 100 cents give selling price in London

Exchange...... ......1s 2d, 1s 2½d, 1s 3d, 1s 3½d, 1s 4d 1s 4½d, 1s 5d, 1s 5½d, 1s 6d, 1s 6½d' 1s 7d.

H. K. Rutherford...1s 4d, 1s 4·50d, 1s 5d, 1s 5·50d, 1s 6d, 1s 6·50d, 1s 7d, 1s 7·50d, 1s 8d, 1s 8·50d, 1s 9d.

F. F. Street .. ..1s 4·61d, 1s 5·16d, 1s 5·74d, 1s 6·28d, 1s 6·83d, 1s 7·40d, 1s 7·94d, 1s 8·50d, 1s 9·05d, 1s 9·63d, 1s 10·17d.

Evidently Mr. Street's tables are intended for buyers of tea in Colombo, and thus include a good FAT commission sufficient to make a tea grower

ENVIOUS.

TROPICAL PRODUCTS IN BRITISH NORTH BORNEO.

Kandy, Oct. 3rd.

DEAR SIR,—I send a pamphlet on coffee, cacao and other tropical products grown in British North Borneo, compiled by Mr. Henry Walker, the Commissioner of Lands, an old Ceylon resident. Mr. F. G. Callaghan and Mr. P. Christian, whose names appear in the pamphlet, are also old residents.

I have lately received from Mr. Christian an estimate of the cost of forming a Liberian coffee plantation in British North Borneo of 200 acres, in which he estimates the total cost inclusive of the purchase of land for the first 3 years and laying down the produce in London at R50,000

At the end of the 3rd year, he estimates a crop from these 200 acres, cwt. 1,000 at £4 10s=£4,500 at 1s 8d exchange R54,000

Net profit .. R4,000

For the 4th year such an estate would probably give from cwts. 6 to cwts. 8 per acre, say cwts. 1,400 laid down in London at a cost of R16,000.

The above information I hope will be interesting to your readers, and I remain, yours faithfully,

W. D. GIBBON.

CEYLON TEA AND ITS NATURAL MARKET.

SIR,—"Vendor" in your issue of 3rd instant concludes his letter by calling upon Mr. Street to revise his table "a little." I second that suggestion, but I would say "a good deal" instead of "a little."

It is patent to anyone making use of that table (F. F. Street's) that it includes not only the *very full* allowance of 2d for London charges, *i.e.* freight, insurance, landing, rents and selling commissions of brokers and agents in London, but also a Colombo buying commission of from 4 to 6 per cent or it may be more. Having bought Mr. Street's tables and used them, never thinking that they contained any item such as Colombo buying commission. I would now ask Mr. Street through your columns to state what percentage of Colombo commission his figures include.

We want new tables based on 1½d which now-a-days covers every charge in London account sales. Vendors of green leaf would then deduct (not 19 cents as allowed by Rutherford, but) 13 cents to cover all cost of manufacture, &c., and the remainder divided by 4 would give the correct value of

LEAF.

P.S.—On the new basis of 1½d off only for London charges, vendors would then expect to see 100 cents precisely marked in the tables whenever the selling price of tea in London was say 1½d per lb. more than the rates of exchange mentioned in th tables, thus:—

Selling Price. s. d.	Exchange. s. d.	Cents.
1 11½	1 10	100
1 10½	1 9	100
1 9½	1 8	100

Rutherford's tables (based on 2d London charges) do not bear this test—he is often out 1 and 2 cents —100 cents being by him stated sometimes as 101 and at other times as 99.

CUBEB CULTIVATION.

Colombo, Sept. 15th.

To the Secretary of the Ceylon Planters' Association, Kandy.

Dear Sir,—At the request of Mr. H. VanPrehn of Plaver, I beg to enclose translation of a letter for your perusal and trust it may prove of interest to your Association,—I am, sir, yours faithfully, (Signed) RICHARD REMMERS, Consul for the Netherlands.

Plaver, near Salatiga, Java, Aug. 17th.

The Consul for the Netherlands, Colombo.

SIR,—Having read in one of the Indian papers that the planters of Ceylon are trying to secure Cubeb plants from here since those planted some years ago by them did not grow, I beg to inform you that I can supply these plants during November next at fl. 0 15 ea. delivered on my estate and fl. 0 20 per plant delivered at Samarang, and should wish to know whether you will be good enough to advertise the sale of them in one or more of your local papers at the prices above stated. It is my intention in the meantime to advertise the sale of these plants in the Java newspapers towards the end of next month, and should any of the Ceylon planters require them they must send their orders in time. I may mention that the plants are placed in bamboo pots so as to secure them from damage.

Thanking you beforehand for the trouble I am giving you, I remain, sir, your obedient servant,

(Signed) H. VAN PREHN.

THE REPORT of the Cinchona plantation and factory of the Government of Bengal, under Dr. King and Mr. Gammie, shows a falling off in the profits as compared with the previous year. The loss was partly due to a general depression in the cinchona industry, and to the large exportation from Ceylon having reduced prices. The year marks an era in the manufacture of the febrifuge, for during it the new fusil oil process for extraction entirely superseded the old acid and alkali process. The sales of febrifuge and quinine during the year were in quantity between 7,000 and 8,000 pounds at R14 per pound for cinchona and R17 per pound for quinine ; and the sum realized was R1,13,000, roundly, as compared with R1,29,000 the year before.—*Madras Times.*

AERATED TEA.—It is said we may shortly expect to see a company launched for the manufacture and sale of the aerated tea respecting which my letters a short time back gave you some account. A specimen of the bottles in which this new competitor for public favour is to be sold has this week been shown to me, and from the label it bore I see the proprietors have chosen as the name by which the beverage is to be known "Theafoam." Not a bad name, we think, for a liquor which pours out with a fine, sparkling, frothy head. Some of us venture to predict for this liquor a very large amount of popularity, and in that case, should its consumption ultimately at all approved that of some other well-known effervescent beverages, its manufacture may have a sensible effect upon the consumption of your island grown teas.—*Cor.*

NOTES ON POPULAR SCIENCE.

BY DR. J. E TAYLOR, F.L.S., F.G.S., &c.,
EDITOR OF "SCIENCE GOSSIP."

In a few years the world will be one botanical parish. The distribution of plants, and their localisation here and there, is one of the most suggestive of scientific generalisation. How did special plants get to special places? None even of the ingenious authors of the over-estimated "Lux Mundi" endeavour to explain it. But steam and increasing population are giving the finishing stroke to the phenomenon. Plants characteristic of different countries are getting dreadfully mixed up. Certain "bush" seeds reach us from Australia, the Cape, the Argentine, &c., brought in the uncleaned fleeces of wool. The latter are washed and combed in Gloucestershire and Yorkshire, and the seeds are stranded on the river banks, or distributed by the agency of birds, so that they are spreading over the country, or they are brought in ships' ballast, and afterwards disseminated. In the north of England farmers are in the habit of putting the screenings of foreign wheat on the land, and a host of foreign weeds has sprung up in consequence.

Now that unknown Africa is becoming known, and a new and vast field for colonisation is likely to be opened out by the recently-founded East African Company, it is well to learn what science has to say upon that pest of the Dark Continent—the African fever. This is the unseen demon which haunts the European traveller in tropical and equatorial Africa by night and day. Once the system has been thoroughly steeped in it, it becomes chronic. He may have left Africa for ever, but the African or malarial fever will not leave him. Dr. Crumbie Brown, of Edinburgh, has just issued a *brochure* on the subject, which he has addressed to the secretaries of all British and American missions in hot countries. One of the newly-acquired territories of the above company has been very properly named "Livingstonia," after great traveller. Professor Drummond, in his delightful work on *Tropical Africa*, says of this place:—"It is one of the loveliest spots in the world, and it was hard to believe, sitting under the tamarind trees by the quite lake shores, that the pestilence which wasteth at midnight had made this beautiful spot its home." Dr. Brown is of opinion that the Australian blue-gum tree is the antidote to malarial fever. There is no worse place for malaria, even in Africa, than the Campagna at Rome. Few visitors to Italy dare bide there in the summer months. But the blue-gum tree was planted in the Roman marshes a few years ago, and the results have been remarkably successful. Thte microbe of malarial fever and the gum tree do no get on well together. The Trappist monastery in the Campagna had to be abandoned on account of the fever in 1868, but since the gum tree woods have been planted it has been reinhabited, although the place had previously gone by the name of "The Tomb." The Trappist brotherhood, aided by the Italian Government, are extending the cultivation of gum trees in the Campagna. When we have got real possession of tropical Africa, our first duty will be to plant forests of gum trees there.—*Australasian.*

SACRED TREES OF THE WORLD.

The palm, the oak, and the ash are the three trees which since times immemorial, were held to be sacred trees. The first among them, which figures among them, which figures on the oldest monuments and pictures of the Egyptians and Assyrians, is the date-palm (*Phœnix dactislifera*), which was the symbol of the world and of creation, and the fruit of which filled the faithful with divine strength, and prepared them for the pleasures of immortality. "Honour," said Mohammed, "thy paternal aunt, the date-palm, for in Paradise it was created out of the same dust of the ground." Another Mohammedan tradition of a later period says that when Adam left Paradise he was allowed to take with him three things—a myrtle, because it was the most lovely and the most scented flower of the earth; a wheat-ear, because it had most nourishment: and a date, because it is the most glorious fruit of the earth. This date from Paradise was, in some marvellous way, brought to the Hejaz; from it have come all the date-palms in the world, and Allah destined it to be the food to all the true believers, who shall conquer every country where the date palm grows. The Jews and the Arabs, again, looked upon the same tree as a mystical allegory of human beings, for, like them, it dies when its head (the summit) is cut off, and when a limb (branch) is once cut off it does not grow again. Those who know can understand the mysterious language of the branches on days when there is no wind, when whispers of present and future events are communicated by the tree. Abraham of old, so the rabbis say, understood the language of the palm. The oak was always considered a "holy" tree by our own ancestors, and, above all by the nations of the North of Europe. When Winifred of Devonshire (680-754 A.D.) went forth on his wanderings through Germany to preach the Gospel, one of his first actions was to cut down the giant oak in Saxony, which was dedicated to Thor and worshipped by the people from far and near. But when he had nearly felled the oak, and while the people were cursing and threatening the saint, a supernatural storm swept over it, seized the summit, broke every branch, and dashed it, "quasi superni motus solatio," with a tremendous crash to the ground. The heathens acknowledged the marvel, and many of them were converted there and then. But the saint built a chapel of the wood of this very oak, and dedicated it to St. Peter.

The sacred oaks, it must be admitted, do not seem to have always done their duty. Thus, for instance, a famous oak in Ireland was dedicated to the Irish Saint Columban, one of the peculiarities of the tree being that whoever carried a piece of its wood in his mouth would never be hanged. After a time, however, the holy oak of Kenmare was destroyed in a storm. Nobody dared gather the wood, except a gardener, who tanned some shoe leather with the bark; but when he wore the shoes made of this leather for the first time he became a leper, and was never cured. In the abbey of Vetrou, in Brittany, stood an old oak tree which had grown out of the staff of St Martin, the first abbot of the monastery, and in the shade of which the princes of Brittany prayed whenever they went into the Abbey. Nobody dared to pick even a leaf from this tree, and not even the birds dared to peck at it. Not so the Norman pirates, two of whom climbed the tree of St. Martin to cut wood for their bows. Both of them fell down and broke their necks. The Celts and Germans and Scandinavians, again, worshipped the mountain ash (*Fraxinus*), and it is especially in the religious myths of the latter that the "Askr Yggdrasil" plays a prominent part. To them it was the holiest among trees, the "world tree" which, eternally young and dewy, represented heaven, earth, and hell. According to the Edda, the ash yggdrrasil was an evergreen tree. A specimen of it (says Adam of Bremen) grew at Upsala, in front of the great temple, and another in Dithmarschen, carefully guarded by a railing, for it was, in a mystical way, connected with the fate of the country. When Dithmarschen lost its liberty the tree withered, but a magpie, one of the best prophesying birds of the north, came and built its nest on the withered tree and hatched five little ones, all perfectly white, as a sign that at some future time the country would regain its former liberty.—*Deutsche Rundschau in Public Opinion.*

DOMESTIC USES FOR AMMONIA.

A little ammonia in tepid water will soften and cleanse the skin.

Spirits of ammonia will often relieve a severe headache.

Door plates should be cleansed by rubbing with a cloth wet in ammonia and water.

If the color has been taken out of silks by fruit stains, ammonia will usually restore the color.

To brighten carpets, wipe them with warm water in which has been poured a few drops of ammonia.

One or two tablespoonfuls of ammonia added to a pail of water will clean windows better than soap.

A few drops in a cupful of warm water, applied carefully, will remove spots from painting and chromos.

Grease spots may be taken out with weak ammonia in water; lay soft white paper over and iron with a hot iron.

When acid of any kind gets on clothing, spirits of ammonia will kill it. Apply chloroform to restore the color.

Keep nickel, silver ornaments, and mounts bright by rubbing with woolen cloth saturated in spirits of ammonia.

Old brass may be cleaned to look like new by pouring strong ammonia on it, and scrubbing with a scrub brush; rinse in clear water.

A tablespoonful of ammonia in a gallon of warm water will often restore colors in carpets; it will also remove whitewash from them.

Yellow stains left by sewing machine oil, on white, may be removed by rubbing the spot with a cloth wet with ammonia, before washing with soap.

Equal parts of ammonia and turpentine will take paint out of clothing, even if it be hard and dry. Saturate the spot as often as necessary, and wash out in soap suds.

Put a teaspoonful of ammonia in a quart of water, wash your brushes and combs in this, and all grease and dirt will disappear. Rinse, shake, and dry in the sun or by the fire.

If those who perspire freely would use a little ammonia in the water they bathe in every day, it would keep their flesh clean and sweet, doing away with any disagreeable odor.

Flannels and blankets may be soaked in a pail of water containing one tablespoonful of ammonia and a little suds. Rub as little as possible, and will be white and clean and will not shrink.

One teaspoonful of ammonia to a teacupful of water will clean gold or silver jewellery; a few drops of clear aqua ammonia rubbed on the underside of diamonds will clean them immediately, making them very brilliant.—*Scientific American.*

THE MODEL DUKE ESTATE, TAVOY, BURMA.

Dear Sir,—In your paper of the 5th instant I see you have written a long leader on "*Exotics*," which does your paper great credit, and will be read with interest by all those interested in new products.

But you have been led into a mistake by the report on the experimental cultivation in Mergui, which I shall be much obliged to you if you will correct. You say in your first paragraph that you cannot allow the fact of the first *Tea* being produced in lower Tenasserim, by the officers of the Forest Department, to pass unnoticed. Now, I beg to inform you that the 172 plants remaining in the Mergui garden were made a present of by me to the "Local Government," through Mr. Palmer, then in charge of the Mergui garden. I gave over 300 splendid hybrid plants to Mr. Palmer in July 1886, and the remaining 172, are what have succeeded to grow, with the treatment they have received since! In October 1885, I got two maunds of Tea seed from Seaforth, Ceylon, a place opened up and planted by me.

The seed was selected from the finest trees on Seaforth and forwarded on here by Sir Graeme Elphinstone to me, so that I knew I have the best hybrid that could be produced in *India*, as I myself got the Seaforth Tea seed from there. This I shall prove to you by facts.

All the same, the greatest credit is due to Mr. Palmer, and Capt. now Major, Butler, who first started the garden. Capt Butler first started a small place on his own account, which drew the attention of Sir Charles Bernard when down there. Capt. Butler produced good tobacco, "Coffee Arabica," and had a few varieties of other products, which drew the attention of the worthy Chief Commissioner, and when he saw what success Capt. Butler had attained, he gave a grant at once to start on Government account, on a small scale, so that Capt. Butler had a good 3 years' start ahead of me here.

When I came here Mr. Palmer took charge of the garden and took the greatest interest in it. I went down twice to Mergui, when he was in charge, and gave him advice what to do, which he carried out to the letter, and with good results. Mr. Palmer went down and lived for months in the garden and worked hard, for which I fear he never got the credit.

I went down last year and saw the garden: the oldest coffee was simply splendid and bearing a heavy crop. The gentleman in charge asked me to estimate the same, and I put it down at the lowest figure, viz. 8 cwt. per. acre; but many of the trees were bearing *a good round ton per acre.* The trees had been neglected, and not handled out after last year's crop. Of course this means discredit to no one, as officers being changed so often, they do not know better. Planting, like anything else, is very simple when once you know it.

The Liberian Coffee is a decided success. I have trees here now *12 feet high and 27 feet in circumference*, and loaded with a crop of fine bright Jolaycu resembling a young Jack tree. I have planted up in all, in mixed products, 39 acres. I have Liberian Coffee, Tea, Divi Divi. Annatto, "Bixa Orellana," Croton Oil trees, Pepper Nigrum, Pepper Cubeb, Vanila, Rubber of three varieties viz. Hevea, Ceara and the "Tavoy Rope Rubber," indigenous to Tavoy district, Cocoa, and Jacks of three varieties, viz, Penang, hybrid and common. The Jack is a most valuable shade tree, as well as other value in itself, also mangoes of different kinds, oranges, lime and lemons, Leeches, guavas of 3 varieties, China and common plantains of 8 different kinds, also the China Banana, coconuts, and betelnut trees, now in bearing, Chestnuts just beginning to bear, fine large trees of a good kind, "Cotton" Pernambuco, or what is better known as "kidney cotton." One tree gave me over 3 lb. of produce this year! Cocoa must have shade to be a decided success, but this will be overcome in time, as the soil and climate are perfection for all the products now enumerated. Tobacco I have grown from Sumatra seed, and produced a fine, delicate, well marked leaf. Indigo grows wild in the Tavoy district. Cardamoms also grow wild here. This shows that the Tavoy district is to be the "Eldorado" for planters. Silvestre, formerly Editor of the *Indigo Gazette*, while down here prospecting, found the indigo plant growing wild near *Niadoung* and brought some in and manufactured a small piece. He took the same away with him. Silvestre came here to prospect, which I hope to hear more of it soon.

Coffee, Liberian, is to be one of the greatest successes in this district, and Tea, and Coco, also Arabian Coffee will grow at higher elevation. I never predicted, or said that Arabian Coffee would succeed at a low elevation, and it is only a matter of time and a selected variety from India, Mysore. To gain this end we only want roads up the mountain sides. I planted about 7 or 8 acres with Arabian Coffee here, but of course I had not sufficient elevation. It grew fine. I got the seed from Mr. Petley in the Toungoo Hills, so that I might be clear of leaf disease. It gave a good crop, in fact *too much* the second *year*, and then went out. I sent home a hundredweight in 1887 to Mr. Marlin Leake in London, and it was well reported upon and sold at a fair price.

You will see by this, Mr. Editor, some of the difficulties a planter has to contend with in the beginning in a new country. No one has any idea of the many losses and disappointments one has to contend with at first, even to get seed in a fit state to plant, often rotten before I saw it, seed sent on to Calcutta, from Calcutta to Rangoon, and from thence to here, and often delayed *en-route.*

When the thing is once set agoing there's no more such risks and losses.

The pioneer has the great battle, and should he not succeed in all, he gets all the blame and lots of kicks behind his back. They do not come forward

as honest men and argue the point. It is also hard to do any business with men that do not know the work to be done. No man can make a silk purse out of a sow's ear; money must be first sunk and wait patiently for returns. Coffee and tea planting are not like a crop of potatoes, more especially in a new country. *Exotics* must be acclimatized, and it takes longer in a new country for a new product to the country to come into full bearing. This is clearly shown by the Liberian coffee in Mergui, the same coffee only in full bearing in Mergui planted 3, or you may say 4 years before mine here from seed. People ask me of course—Where is your coffee, where are your returns, is the thing a success? This is the sympathy one gets as a pioneer. What is that fe-*l l*-ow *do-o*-ing down there; is he a planter I wonder or what? Well, I fancy I know the ropes now. But in this climate and with such strong soil, the Planter has nothing to fear; only he must be prepared to wait for returns longer, than one would do in a poor but forcing climate. Coolies will flock to Burma whenever the demand comes. No fear of labour, none in the least. I have a command of labour ready at my call at any moment. Why rice here is only one *half the price in Ceylon*, now only Rs 1·12 per basket, a basket about the same as a bushel, and in Ceylon rice is never cheaper with the planter than Rs 4, and it is impossible to predict a famine here although one had to get rice from Moulmein and carriage to the estate at a distance, it would never overreach Rs 3 here on an average. "Curry-stuffs," fish and fowls, and all necessaries are only about half the price from that in Ceylon, and the district is a healthy one. Opening up new land, of course, is not healthy for a short time, but much can be done by the planter to prevent sickness; all depends on good pure water and an elevated place for their habitations.

Besides, the Burmans work well when one once knows well their ways and treats them kindly and does not bully them. Jack Burman won't stand bullying; he has some pride in him. This is a good part even in poor despised Jack Burman, and he delights to work in the rain, and keeps in good health. I have sometimes as many as 200 working at one time and never had trouble with them in their work. Women and boys get annas 3 per *diem*, the rest 6 annas, and I could get hundreds.

Money is only wanted; all the elements are ready at hand, and coast coolies are ready to be called to Burma at any moment. Labor gives me not a thought. I see and know the way. Labor Laws, of course are much wanted for all Burma, but then you have to go to "India" to ask for this. This will come straight in due course.

Planters have nothing to fear here; I have received the greatest kindness and consideration from all the heads of the different departments, from Sir Charles Crosthwaite downwards; they are as good a set of men as could be found in any other part of the world, and ever ready to give assistance and information as far as lies in their power, and Burma will 'hang fire' until power is given to the Head administrators, not only to the Chief Commissioner, but Governor of Burma or Lt.-Governor with power to act on the spot. I have not the slightest doubt but that this project is near at hand, and then Burma will move forward quickly and staunchly.

I trust this long letter will not weary you, and I shall be much obliged to you, if you do not put it into your waste, paper basket or give it over to your Devil.

I remain, Dear Sir, Yours Sincerely,

JAMES D. WATSON.

4th September, 1890.

—*Rangoon Times.*

A METHOD of clearing forests by poisoning the trees has been introduced in New Zealand. An auger hole is bored into the trunk, and filled with a chemical composition, of which the secret is guarded. In two or three months the tree dies and rots, so that it can be easily removed. In one of the trials recently made no fewer than 700 acres were speedily cleared by this plan, but of course, with the loss of the timber.—*Globe.*

THE largest wheel in the world is being constructed by the Dickson Manufacturing Company, of Scranton, Pennsylvania, for the Calumet and Hecla Copper Mining Company, of Lake Superior. It is intended to lift the "tailings," or waste ore, from the mines of the company, and discharge them into the lake. The wheel is 54ft. in diameter and weighs 200 tons. On its rim are 448 steel buckets, which catch up the "tailings" as the wheel revolves. The velocity of the wheel at its tyre is 600ft. per minute, and it is capable of elevating enough sand in 24 hours to cover an acre of ground with a layer 1ft. deep.—*Globe.*

RECENT experiments by M. Georges Ville at Vincennes, and communicated to the French Academy of Sciences, show very clearly the value of nitrogen in manure for promoting the growth of vegetables. Plants grown with manure containing nitrogen were taller, heavier, and of a darker green than those grown in manure without nitrogen. The same plants grown in earth without manure were conspicuously dwarfish and feeble. The general result of his experiments is that the nature of the soil affects the plant in height, and shape, and colour, as well as in weight of the harvest. With regard to the question of height, it has long being known that Jersey cabbages require a particular soil in order to become very tall.—*Globe.*

WHEN Darwin and other naturalists made their experiments with so-called carnivorous plants, the importance of micro-organisms was not realised, and hence their results are questionable. In 1875, M. Edouard Morren investigated the behaviour of the *Pinguicula* and *Drosera*, and arrived at a conclusion quite different from the opinions of Darwin on these interesting plants. Another series of experiments on the *Nepenthes* has been undertaken by M Raphael Durbois, whose results have just been communicated to the Académie des Sciences, Paris. Sir Dalton Hooker considered that the carnivorous attributes of the *Nepenthes* was beyond a doubt, but M. Dubois has found reason to differ with him. His observations were made on a great variety of these plants at the botanical garden of the Tête d'Or, Lyons, for example the *N. Rafflesiana, Hookeriana, coccinea, phyllamphora, distillatoria, hybrida*, and *maculata*.—*Globe.*

"A WAIL FROM FOOCHOW" might well describe the following which we find in the *N.-C. Herald* of Aug. 22nd:—

From Foochow we have the following tea news, under date the 16th instant:—The shipments during the past fortnight have barely reached a million of lb. The calling steamers have been the "Palamed," "Ajax" and "Pakling." The export to London and the Continent stands today at $10\frac{1}{4}$ millions against 11 millions last year and $17\frac{1}{2}$ millions in 1888. The tone of the market remains quiet. The settlement of 21,000 chests Congou for two weeks is again very small; and, but for the demand for Australia, it would have been very much smaller, as the telegraphed advices regarding Foochow Congou in the London market are sufficiently bad to cause a stoppage of shipment to that quarter altogether. Souchongs have continued in demand and there has been some business in Oolongs and Scented teas. Comparing the latest prices paid with those ruling a fortnight ago, there is no change of importance to note. Tael prices, as lately remarked, are low; but the laying down cost, with the high exchange, is too near London quotations while that market is reported as declining. And in some cases costs are distinctly above Mincing Lane prices; common teas for example are Tls. 5 or $5\frac{1}{4}$d here, and in London only $4\frac{1}{4}$ to $4\frac{1}{2}$d per lb. As the inanimation in this market grows more prolonged, so the estimates of the total supply for the season become smaller. Whereas a fortnight ago a total approaching 380,000 chests was thought likely, 360,000 chests is now looked upon as the probable season's supply. The settlements of Congou to date are 177,000 chests. For the corresponding eleven weeks after the opening of the market last year 274,000 chests had been settled, and during the same period in 1888, 336,000 chests. The stock of Congou today is 156,000 chests against 168,000 chests last year, and 13,000 chests in 1888.

PLANTING IN CENTRAL AFRICA.—An ex-Ceylon planter now in Queensland writes that a relative—a trained arboriculturist—has just gone to Mandala near Lake Nyassa under an engagemont to the African Lakes Co , to conduct experiments in the growing of tropical products. Mandalla and Nyassaland have one of the finest climates in the world. "The Moirs" have already a flourishing coffee plantation there.

NUTMEGS.—The cultivation of nutmegs in New Guinea is described by one who has witnessed it as a very interesting progress. The aroma of the nutmeg is so penetrating as to make the country for a long distance delightfully fragrant. The trees grow luxuriously and the fruit resembles a pear. When it ripens it opens and displays the nut with its beautiful red coating of mace. At this stage the nuts are picked off and carried in baskets into the house, where they are husked and put on shelves. Then they are partially roasted over a slow fire until all the moisture is extracted: Afterwards they are cooled and carried to the village in nets to await the traders. The nutmeg grows in perfection in the West Indies and Brazil, and may some day prove to be a valued product of some sections of this country.—*Madras Times.*

THE MUTURAJAWELLA PADDY FIELDS.—Mr. de Mel's scheme to irrigate and successfully cultivate the fields at Muturajawella is now an accomplished fact. Harvest operations have already begun, and the work is now in full swing. A good quantity of the paddy has turned out *Bol* or devoid of seed. This was due to the want of rain during the ripening season (July). The enterprising and genial proprietor of the fields, it is to be regretted, is unable to be present at the spot during the harvest owing to illhealth. Mr. de Mel is still confined to his room with an attack of fever, which he contracted soon after his return from Rakwana, whither he went in company with Mr. Obeysekere, as Directors of the Ceylon Gem Mining Company, Limited, to report on some Gem lands. It appears that during the journey both up and down the weather was very wet, and Mr. de Mel was considerably exposed to it. He caught a chill then, and is still suffering from its effects. Under Dr. Garvin's able treatment, we trust Mr. de Mel will be quite well before long.—*Cor.*, local "Examiner.'

ORIENTAL COFFEE COMPANY.—The fourteenth annual meeting of the shareholders of the above-named Company was held on Thursday week at the offices, No. 32, Great St. Helens, E.C., under the presidency of Mr. John Young. The Chairman moved the adoption of the directors' report and statement of accounts. The board expressed regret that the year's working had proved less favourable than was expected at that date of last meeting. The monsoon, then prevalent, proved abnormally heavy, rain and gales having been experienced for four months almost without intermission, doing much injury to the crop, which turned out only 53 tons 2 cwt. The deficiency, however, was to some extent compensated by higher prices, the average reached being 92s 3d per cwt., against 86s 9d the previous year. The balance sheet showed a net profit for the year of £660 16s 3d, and an available balance at the credit of profit and loss of £974 7s 5d, out of which the directors recommended the payment of a dividend of 2½ per cent, carrying forward £224 7s 5d to next year's account. The recent rise in the price of silver and rates of exchange affected the result of the year to some extent, and would, so long as it lasted, be very prejudicial to the planting intrest. The prospects of the coming year had unfortunately been much affected by the unusual season above mentioned, rain having continued close up to picking time, and delayed it beyond the usual period, not giving the trees time to recover themselves before the blossoming season. The superintendent advised that he could hardly expect the coffee crop to be better than the last, and in this respect the district would be more favoured than Wynaad, where the crops were the most disastrous ever known. So far as could be judged at present, the prospect was in favour of higher prices than last year.—*Home and Colonial Mail*, Sept. 26th.

BANANAS.—The *Panama Star and Herald* says:— "We have received from New York a tabulated statement of the banana trade during 1889 between Central American and West Indian ports and the United States, which is full of suggestive interest to all who are following the development of this trade. Taking the New York branch of the business, which is the largest, we find that the total imports for the year aggregated 3,639,593 bunches, to which Jamaica contributed about one-third, or 1,346,062, whilst Colon only sent 216,528. The other shipments were as follows:—From Baracoa and Banes, 1,190,478; from Port Limon, 609,798; from Honduras, 276,727. The New Orleans banana trade for the same time was as follows:—From Honduras, 1,867,429; from Bluefields, 563,382; from Port Limon, 376,401; from Boca del Toro, 135,946; from Jamaica, 2,900—total, 2,946,058. Boston received during the same time shipments from Jamaica and Baracoa amounting to 1,292,946 bunches, whilst Philadelphia from these places and Bluefields received 853,183 bunches and Baltimore 358,294, making the entire annual importation of bananas to the United States 9,090,074 bunches, plus another 100,000 bunches estimated for other ports not specified in the statement."—*Colonies and India*, Oct. 1st.

CEYLON EXPORTS AND DISTRIBUTION 1890

COUNTRIES.	Coffee cwt. Plantation	Coffee cwt. N'tive	Coffee cwt. Total.	Cinchona. 1890 B'nch &Trunk lb.	Tea. 1890 lb.	Cocoa. cwt.	C'moms. lb.	Cinnamon. Bales lb.	Cinnamon. Chips lb.	Coconut Oil. 1890 cwt.	Coconut Oil. 1889 cwt.	Pl'bago. 1890 cwt.
To United Kingdom ...	49174	100	49274	6554858	35544379	8457	123666	931879	227094	57101	83269	131002
" Marseilles ...	157	...	157	12500	762	80	...	100460	2800	3000	...	...
" Barcelona ...	...	...	...	...	600	...	...	35000	...	...	...	...
" Genoa ...	12	...	12	...	1714	...	...	46425	33824	3422	2678	1134
" Venice ...	71	232	303	70412	2435	...	...	11100	11200	...	...	...
" Trieste ...	7830	97	7927	252	1670	...	...	3900	8848	15242	6730	...
" Odessa ...	32	...	32	...	265	...	...	...	...	3244	5415	...
" Hamburg ...	296	...	296	730	33339	814	1131	246400	80772	16568	7665	30895
" Antwerp ...	17	20	37	217919	1600	...	...	19500	5600	1161	1492	13949
" Bremen ...	18	...	18	...	13787	151	...	20606	...	...	...	5068
" Havre ...	...	100	100	...	4761	...	...	10000	...	2007	4578	...
" Rotterdam & Amsterdam	3	...	3	21384	...	55	...	...	11200	10	...	1616
" Africa ...	16	...	16	...	37022	...	...	5000	...	8	34	...
" Mauritius and Eastward	277	333	610	...	83018	498	...	28500	...	41265	2 18	...
" India ...	837	718	1555	...	100550	...	140522	5020	...	71813	3.587	241
" Australia & New Zealand	8632	1120	9752	...	1799175	9	40	8474	...	1213	1944	342
" America ...	1924	...	1924	317658	183879	1509	4956	89228	...	38322	82758	115469
" Stockholm ...	...	...	...	...	1703	...	...	...	...	...	...	...
" Constantinople ...	...	...	...	...	2122	...	..	...	...	...	..	...
Total Exports from 1st Jan. to 30th Oct. 1890	69296	2720	72016	7195713	37812781	11573	270315	1561492	381338	254476		299716
Do 1889	58487	406[illegible]	62668	7876144	27262507	11757	229879	2005752	383204	232268		32 589
Do 1888	113578	4435	118013	10935574	18490110	10419	220175	1392564	396159	300727		207762
Do 1887	147182	6972	154202	10244557	10322574	14005	251839	1208751	226152	303652		167655

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis Peat's London Price Current, September, 25th 1890.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White ...	Slightly softish to good / Hard bright...	£5 10s a £7 10s
Yellow ...	Do. drossy & dark ditto	95s a 110s
CINCHONA BARK—Crown per lb.	Renewed ...	3d a 1s
	Medium to fine Quill ...	4d a 9d
	Spoke shavings ...	2d a 9d
	Branch ...	1d a 3d
Red	Renewed ...	2d a 1s
	Medium to good Quill...	4d a 9d
	Spoke shavings ...	2d a 5d
	Branch ...	1d a 3d
	Twig ...	1d a 1½d
CARDAMOMS Malabar and Ceylon	Clipped, bold, bright, fine	1s 8d a 3s 6d
	Middling, stalky and lean	2s 6d a 3s
Alleppee	Fair to fine plumpclipped	1s 4d a 3s 4d
Tellicherry	Good to fine ...	1s 3d a 2s 3d
	Brownish ...	9d a 1s 3d
Mangalore	Good & fine, washed, bri[ght]	1s 6d a 2s 8d
Long Ceylon	Middling to good...	6d a 2s
CINNAMON 1sts	Ord. to fine pale quill ...	7½d a 1s 7d
2nds	,, ,, ,, ,, ...	7d a 1s 4d
3rds	,, ,, ,, ,, ...	6d a 1s 2d
4ths	Woody and hard ...	5½d a 11d
Chips ...	Fair to fine plant...	2½d a 7½d
COCOA, Ceylon ...	Bold to fine bold ...	96s a 100s
...	Medium ...	85s a 95s
	Triage to ordinary ...	55s a 75s
COFFEE Ceylon Plantation	Bold to fine bold colory...	108s a 113s
	Middling to fine mid. ...	105s a 107s 6d
	Low mid. and Low grown	100s a 104s 6d
	Smalls ...	100s a 104s
Native	Good ordinary ...	92s a 98s
Liberian ...	Small to bold ...	90s a 99s 6d
East Indian ...	Bold to fine bold...	105s a 115s
	Medium to fine ...	100s a 105s
	Small ...	93s a 98s
Native	Good to fine ordinary ...	92s a 98s
COIR ROPE, Ceylon & Cochin	Mid. coarse to fine straight	£14 a £20 15s
FIBRE, Brush ...	Ord. to fine long straight	£15 5s a £28
Stuffing ...	Coarse to fine ...	£5 a £18
COIR YARN, Ceylon ...	Ordinary to superior ...	£13 a £30
Cochin ...	Ordinary to fine ...	£12 a £36
Do	Roping fair to good ...	£12 a £15 10s
COLOMBO ROOT sifted ...	Middling wormy to fine...	18s a 27s 6d
CROTON SEEDS, sifted ...	Fair to fine fresh...	10s a 15s
GINGER, Cochin, Cut	Good to fine bold...	50s a 65s
,,	Small and medium ...	26s a 39s
Rough	Fair to fine bold ...	20s a 25s
,, ...	Small ...	14s a 18s 6d
GUM ARABIC, Madras...	Dark to fine pale ...	15s a 55s
NUX VOMICA ...	Fair to fine bold fresh ...	10s a 12s
	Small ordinary and fair...	6s a 8s 6d
MYRABOLANES ...	Good to fine picked ...	10s a 10s 9d
	Common to middling ...	8s a 8s 9d
	Fair Coast... ...	8s 9d a 9s
Pickings	Burnt and defective ...	4s 9d a 6s 3d
OIL, CINNAMON ...	Fair to fine heavy ...	1s a 2s 6d
CITRONELLE ...	Bright & good flavour ...	⅞d
LEMON GRASS ...	,, ,, ,, ,, ...	1½d a 1¾d
ORCHELLA WEED ...	Mid. to fine, not woody...	20s a 33s
PEPPER, Malabar, blk. sifted	Fair to bold heavy	4⅞d a 5¼d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White ...	,, ,, ...	1s 1⅜d a 1s 2½d
PLUMBAGO Lump ...	Fair to fine bright bold...	15s a 19s
	Middling to good small...	11s a 14s
Chips ...	Slight foul to fine bright	9s a 12s
dust ...	Ordinary to fine bright ...	5s a 9s
RED WOOD	Fair and fine bold ...	£4 10s a £4 15s
SAPAN WOOD ...	Middling coated to good	£5 a £8
SANDAL WOOD, logs ...	Fair to fine flavor ...	£30 a £58
Do. chips ...	Inferior to fine ...	£9 a £30
SENNA, Tinnevelly ...	Good to fine bold green...	5d a 8d
	Fair middling medium...	2d a 4d
	Common dark and small	1d a 2d
TURMERIC, Madras ...	Finger fair to fine bold [bright	16s a 18s
Do. ...	Mixed middling [bright	15s a 16s
Do. ...	Bulbs ...	10s a 12s
Cochin ...	Finger ...	11s a 12s
VANILLOES, Mauritius & Bourbon, 1sts	Fine crystalised 6 a 9inch	16s a 23s
2nds	Foxy & reddish 5 a 8 ,,	13s a 18s
3rds	Lean & dry to middling under 6 inches	8s a 11s
4ths	Low, foxy, inferior and [pickings	3s a 7s
FROM BOMBAY AND ZANZIBAR.		
ALOES, Socotrine ...	Good and fine dry ...	£4 a £7
Zanzibar & Hepatic...	Common and good ...	40s a £5 5s
CHILLIES, Zanzibar ...	Fair to fine bright ...	32s a 35s
	Ordinary and middling...	28s a 31s

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTATIONS
CLOVES, Zanzibar and Pemba, per lb	Good and fine bright ...	5½d a 5¾d
	Common dull to fair ...	4⅞d a 5⅜d
Stems...	Common to good ...	1⅛d a 1¼d
COCULUS INDICUS ...	Fair ...	10s a 11s
GALLS, Bussorah & Turkey ₩ cwt.	Fair to fine dark blue ...	52s 6d a 57s 6d
[cwt.	Good white and green...	40s a 50s
GUM AMMONIACUM per	Blocky to fine clean ...	20s a 50s
ANIMI, washed, ₩ cwt.	Picked fine pale in sorts,	£13 a £15s
	part yellow and mixed	£10 a £13
	Bean & Pea size ditto ...	£5 a £8 10s
	amber and red bold ...	£10 a £12
scraped...	Medium & bold sorts ...	£5 a £8
ARABIC E.I. & Aden ..	Sorts	32s a 75s
per cwt. Ghatti ...	Sorts to fine pale ...	20s a 65s
Amrad cha	Good and fine pale ...	50s a 65s
	Reddish to pale brown ...	25s a 45s
ASSAFŒTIDA, per cwt.	Clean fair to fine ...	26s a 38s
	Slightly stony and foul ...	16s a 25s
KINO, per cwt.	Fair to fine bright ...	25s a 30s
MYRRH, picked ,,	Fair to fine pale ...	£5 a £7 10s
Aden sorts	Middling to good ...	72s 6d a 80s
OLIBANUM, drop per cwt.	Fair to fine white ...	35s a 55s
,,	Reddish to middling ...	25s a 34s
pickings...	Middling to good pale ...	12s a 20s
siftings ...	Slightly foul to fine ...	10s a 15s
INDIARUBBER Mozambique, per lb.	red hard ...	2s a 2s 6d½
Ball & Sausage	white softish ...	1s 5d a 2s
	unripe root ...	1s a 1s 11d
	liver ...	1s 3d a 2s 3d
FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts per lb.	Nearly water white ...	4d a 4½d
2nds ,, ...	Fair and good pale ...	3⅜d a 3¾d
3rds ,, ...	Brown and brownish ...	3¼d a 3½d
INDIARUBBER Assam, per lb.	Good to fine	2s a 2s 6d
	Common foul and mixed	9d a 1s 10d
Rangoon ...	Fair to good clean ...	2s a 2s 4d
Madagascar	Good to fine pinky & white	2s 9d a 3s 2d
	Fair to good black ...	2s a 2s 6d
SAFFLOWER ...	Good to fine pinky ...	60s a 70s
	Middling to fair ...	40s a 60s
	Inferior and pickings ...	15s a 25s
TAMARINDS ...	Mid. to fine *black* not stony	10s a 12s 6d
	Stony and inferior ...	4s a 6s
FROM CAPE OF GOOD HOPE.		
ALOES, Cape, per cwt. ...	Fair dry to fine bright ...	22s 6d a 24s
...	Common & middling soft	12s a 21s
Natal ...	Fair to fine ...	none here
ARROWROOT Natal per lb.	Middling to fine ...	2d a 3½d
FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China, ₩ cwt.	Good, pure, & dry white	152s 6d a 160s
Japan ...	,, ,, pink	
GAMBIER, Cubes, cwt. ...	Ordinary to fine free ...	38s a 40s
	Pressed	Nominal
Block [per lb.	Good ...	25s 6d a 25s 9d
GUTTA PERCHA, genuine	Fine clean Banj & Maca- [sar	3s 6d a 5s
Sumatra...	Barky to fair	2s a 3s 9d
Reboiled...	Common to fine clean ...	4d a 2s
White Borneo ...	Good to fine clean ...	2s a 3s
	Inferior and barky ...	1s 4d a 2s
NUTMEGS, large, per lb...	57's a 80's, garbled ...	2s 10d a 4s
Medium ...	83's a 95's ...	2s 8d a 2s 9d
Small ...	100's a 160's ...	1s 6d a 2s 7½d
MACE, per lb. ...	Pale reddish to fine pale	2s 6d a 2s 10d
	Ordinary to fair ...	2s 1d a 2s 4d
	Chips and dark ...	1s 6d a 2s
RHUBARB, Sun dried, per lb.	Good to fine sound ...	1s 3d a 3s 2d
	Darkordinary & middling	8d a 1s 3d
High dried ...	Good to fine ...	9d a 1s 2d
	Dark, rough & middling...	3d a 7d
SAGO, Pearl, large, ₩ cwt.	Fair to fine ...	17s a 18s
medium ...	,, ,, ,, ...	15s a 17s 6d
small ...	,, ,, ,, ...	10s 6d a 13s
Flour [per lb.	Good pinky to white ...	8s a 12s
TAPIOCA, Penang Flake	Fair to fine ...	2d a 2⅜d
Singapore ...	,, ,, ...	1⅞d a 2¾d
Flour ...	,, ,, ...	10s a 15s
Pearl ...	Bullet, per cwt. ...	21s a 21s 6d
	Medium ,, ...	17s a 18s
	Seed ,, ...	16s a 17s 6d

THE MAGAZINE

OF

THE SCHOOL OF AGRICULTURE,

COLOMBO.

Added as a Supplement monthly to the "TROPICAL AGRICULTURIST."

The following pages include the contents of the *Magazine of the School of Agriculture* for November :—

VEGETABLE MANURES AND CHEAP FERTILIZERS.

VEGETABLE manures, like cattle manure, contain all the ingredients of ordinary crops, and hence may be called general manures, though they are more slow-acting than cattle manure, and contain a larger percentage of water. They may be applied alone or mixed into a compost with cattle manure. Many of them contain an excess of nitrogen, and are sometimes classed under nitrogenous manures. The action of green manures may be said to be three-fold: they act mechanically, rendering the soil more open; they supply humus; and lastly, they act as true manures, contributing the soluble ingredients of plant food to the soil. The value of vegetable manures depends on the kind of plant as well as the part of the plant used. When crops (such as the legumes) are ploughed directly into the land upon which they are grown for the special purpose of supplying a green manure, it is as a rule advisable that they should be taken out of the land just before flowering, as at this stage they contain the maximum of valuable ingredients in leaf and stem. For green manuring by burying in the whole crop, rapid-growing plants are most suitable. Sometimes the crop-residue only is used after the harvesting of the crop, and in the case of leguminous crops it has been often found that the root-system is equal in weight to the weight of the crop above ground. The roots of this order of plants when buried in the soil have a very beneficial effect on poor soils. Whatever may be the doubts that exsit as to the exact manner in which the leguminosæ improve the soil by accumulating nitrogen in the land, that they do so, and that the ploughing in of them or any part of them improves the condition of soils, there can be no doubt of. Where the crop grown on the land is ploughed in, the main advantage derived is that the ingredients of plant food are collected and placed in a proper position and condition in the soil. Where, however, the green crop is transferred to the land, there is a distinct importation of plant food into the soil.

Peat is useful for soils deficient in organic matter, good dry peat containing about 1 per cent. of nitrogen and from 5 up to 20 per cent. of mineral matter, which contains fair proportions of phosporic acid and potash. Peat decomposes very slowly, and is best composted with lime. It is sometimes charred, and the residue used as a fertilizer either directly or after absorbing liquid manure. The charring process, however, causes the loss of almost all the nitrogen. Peat often contains injurious ferrous salts, and hence it is a good plan to treat it with lime before applying it to land.

Coconut husk should be applied in as fine a state of division as possible in the form of coir dust. The so-called coir dust as supplied from mills is often found to consist of husk for the most part in a long fibrous condition. It contains from 2·5 to ·5 of nitrogen and a fair proportion of mineral matter. Coconut fibre is a good mechanical agent and a splendid absorber and retainer of moisture.

Tanner's bark, owing to its hardness and thickness, decomposes with very great difficulty, and is therefore best applied after burning in spite of the loss of nitrogen which results.

Sawdust has little value as a manure since it is so slow-acting, though it is a good mechanical agent and an excellent absorbent. It should form a good medium for taking up the ammoniacal liquor of gas-works.

The leaves of trees may be said to contain nitrogen from ·5 to ·1, phosphoric acid ·1 to ·5, and potash from 1 to 3 per cent. They are either ploughed in directly or first composted. Some of the trees of which the leaves are used among native cultivators in the villages, are *Cerbera Odallam* (Sin. Kuduru), *Taprosia Purpurea* (Sin. Pila), *Croton Lacciferum* (Sin. Keppitya), *Pongamia Glabra* (Sin. Magulkaranda), and *Callicarpa Lantana* (Sin. Illa).

Sea-weed is another form of vegetable manure which was at one time much in vogue. In some soils it has been known to double the produce, and its use in potato cultivation is still kept up in Ireland, while in our own Island it is favoured in the Northern Province. In the Channel Isles there are certain restrictions placed on the collecting of sea-weed. The great objection to sea-weed is the large percentage of water (about 90 per cent.) it contains. It is found to consist of from 5 to 10 per cent. of mineral matter, the rest being organic matter which yields from ·2 to ·5 per cent. of nitrogen. Sea-weed, if heaped moist, decomposes tolerably readily, and is, where at hand, used with advantage for improving poor soils. Shells are generally composted with the weed, and this addition slightly increases the proportion of phosphoric acid and nitrogen derived from the remains of animalculæ in the shells.

Straw improves the mechanical condition of heavy soils, but decomposes exceedingly slowly, and is of little value as a manure. It is best used in the form of litter after having soaked in the liquid manure in cattle sheds or stables. Composts formed of the store of all refuse matter on cultivated land are of much value, and should be found on every property. These composts should be kept moist, but care should be taken that an excess of water should not be added. The heaps must not be allowed to become acid, as by this putrefaction is prevented: hence lime should be added which also promotes nitrification. Liquid matter must not be allowed to escape from the compost heaps which should be protected from the weather. Liquid manure and urine generally, as well as blood, are useful in soaking the heaps. The various forms of cakes used as manure, though coming under the head of vegetable fertilizers, are generally classed as nitrogenous manures.

OCCASIONAL NOTES.

We have on more than one occasion referred to the carelessness of cattle-owners in taking no precautions in times of diseases, to prevent their animals falling victims to fatal disorders. During the late outbreak of murrain along the Cotta road, the owners of cattle continued to allow their animals to wander about and pick up grass wherever they could find it, only bringing them home in the evening to be tethered to trees in the open air. Within a very small area in the vicinity of Borella some 70 animals died from murrain, and yet the cattle-owners in this part were making no attempt at segregating their stock. Though they were glad to accept or pay a limited sum for disinfectants, they objected to incur the small expenses of erecting sheds for the cattle to be kept and disinfected in. It is just here that the need is felt for Government interference through inspectors who should see that village cattle are not allowed to wander about in times of disease, or indeed at any time. In another column we note the restrictions which are placed upon the grazing of cattle on Government land in the Madras Presidency. The efficacy of disinfectants and other preventative methods (the only means of saving the lives of cattle exposed to contagion) has been amply demonstrated in the case of the cattle at the School of Agriculture escaping when murrain was raging all around them. A large cattle-owner in the vicinity of the school was unfortunate enough to have the disease imported among his herd, and lose some valuable animals, but judicious management even after murrain had gained a footing among his stock, was the means of effectually staying the plague. A poor milk supplier, who lost his herd of six cows, hesitated up to the last to lay out less than the value of one animal in erecting sheds and purchasing disinfectants. It is hardly credible that such conduct is the result of laziness which prevents these men from feeding their animals in their sheds instead of letting them loose to pick up their own food, and attending to both animals and sheds in a proper manner. It is rather the result of ignorance which engenders doubt as to the efficacy of disinfection and segregation in contagious and infectious diseases; and the evil results of this ignorance can only be minimised by enforcing some such measures as are adopted in the case of contagious and infectious diseases in man.

Professor Shield Nicholson, who was lately discovered to be an aspirant to literary fame, is Professor of Commercial and Potitical Economy and Mercantile Law in the University of Edinburgh, and author of "Tenant's gain not landlord's loss, and some other economic aspects of the land question." Professor Nicholson is a young man of a modest disposition, and a favourite among the students. About two years ago the Professor inaugurated a short course of lectures on Economics as applied to agriculture in connection with the agricultural curriculum at the University. He is a fluent speaker and a clever exponent of his subject.

"Trade Prospects in the United States" and "A Central Normal School of Agriculture" are the titles of two short pamphlets published by Professor Wallace of the Edinburgh University. The former is reprinted from the *Glasgow Herald* and the latter from the *Times.* In the one the Professor declares that the breakdown of the protective system in America is at hand, and goes on to show that a declaration of free trade by America would prove to be the most unfortunate event that England has seen for the last half-century. In the other he demonstrates that a Central Normal School of Agriculture will turn out a most expensive concern for which there is no necessity whatever in Great Britain. We hear that the Professor's new book on Australia will be published shortly.

INDIGENOUS FOOD PRODUCTS CULTIVATED AND WILD.

By W. A. De Silva.

31. *Bryophyllum, Calycinum*, Salisb. Sin. *Akkapana, Embulbovi* or *Ratagowa.*

This is a succulent plant which grows in all parts of the Island up to high elevations, and it is a weed found both in cultivated and uncultivated places, growing to the height of from 3 to 5 feet, and bearing panicles of peculiarly-shaped flowers. Its stem is round, thin and green, and its interior is filled with a succulent pith. Prominent scars are left at the places where leaves are broken from the stem. The leaves are thick and succulent, of an elliptical shape, and having crenulated margins which are of a brownish red colour.

The flowers, which are borne in large panicles, have a light greenish-coloured long tubular calyx having a beautiful delicate appearance. Before opening, the whole flower is enclosed in this calyx. The corolla is of a deep red colour, and the flowers contain a sweet nectar.

The leaves of this plant give out buds from their margins, and hence it propagates and spreads very quickly. The hardiness and the ease with which these buds come up are so marked that even a leaf plucked from a plant and nailed to a wall gives out small plants.

The leaves are of a sub-acid taste and are used in making salads as well as curries. The name Ratagowa has evidently been given to this plant, as its leaves are edible like that of the common gowa (cabbage).

Myrtaceae.

32. *Eugenia Aquea*, Brum. Sin. *Jambu.*

This is a tree commonly met with in the Island up to a high elevation. The trees attain somewhat large demensions. The stem is thick and round, and like most dicotyledonous trees it is much branched. The leaves are lanceolate, long, and dark green, with entire margins; and they have an acid taste. The flowers are large, often purple, and contain a large number of stamens arranged in the fleshy calyx. The fruits grow to the size of an egg, and are white when unripe, but attain a reddish hue when fully ripe. The pericarp is of a fleshy nature and covers a seed the size of an ordinary marble. The fleshy pericarp is of an acid taste when raw, but the ripe fruits have a sweetish sour taste. The fruits are much eaten, and the flowers and sometimes the young leaves are also eaten by children. The fruit makes a very good preserve.

The juice of the green leaves of this plant is used in cases of dysentery by native medical practitioners, while the bark is also employed in making decoctions.

33. *Eugenia Zeylanica.* Sin. *Maranda.*

Is a medium-sized tree growing in the hot drier parts of the Island. This is very commonly met with in cinnamon land. The tree is much branched, and the leaves are lanceolate with acute apices and entire margins. The young leaves are pink-coloured and give a very pleasing appearance to the trees. The flowers are small with glandulose calyices, and the fruits are about the size of peas, and white. The pericarp is fleshy and has a sweetish taste. This is generally eaten by boys. Except for this trifling use this plant can hardly be classed as a food product.

34. *Eugenia Caryophyllaea*, Wight. Sin. *Dan.*

This is a common shrub growing up to an elevation of 3,000 ft. It is generally met with on the sides of ditches or rivers, or in marshy places. The shrubs grow from 6 to 10 feet in height, and are covered from the base with branches. The leaves are elliptical with a prominent midrib of slightly dusty colour. The fruits are borne in clusters and are a little larger than peas; they are green and hard when unripe; but the ripe fruits are soft and jet black, and when bruised give a violet colour. These fruits are eaten, and in some places they are even sold in markets. They have a slightly astringent sweetish taste.

The bark and leaves are occasionally used in native medical practice.

35. *Eugenia Jambolana*, Lam. Sin. *Madan.*

This is a tree growing in the drier parts of Ceylon. It grows to a medium size and is generally common in cinnamon land, and land containing fine soil. The trees are much branched on the top. The leaves are green with prominent nerves, and are leathery, entire, and of an elliptical shape. The flowers resemble the other myrtaceous plants. They bear oblong fruits about double the size of an ordinary pea. These when raw are of a green colour, but when ripe they become jet black, giving a deep violet colour when bruised. A single tree bears many bushels of these fruits in a season which are relished much. They have a sweetish aromatic taste. During the season they find a way into the markets. The timber of this tree is hard and elastic, and is used for various purposes. It is said that it has been successfully tried as railway sleepers, and there is a movement on foot to plant them extensively for this purpose in Victoria.

The bark contains a good deal of tannic acid, and has proved to be a good tanning material. The bark and the leaves are used medicinally by the native practitioners of Ceylon. It is stated that some German physicians have found out some remarkable properties in the seed, which has proved to be a remedy for diabetes; and experiments are being made to test its value as such more fully.

CEYLON BEE CULTURE. VI.

By Aba.

Since writing my last article on the above subject, I was agreeably surprized to read in the *Ceylon Observer* a very interesting account of the domestication of the Bambara by Mr. J. Holloway of Wattegama. That gentleman says that a swarm of the Bambara lived for months in 1883 in a hive sent out from Germany and kept in the verandah of his house. He also mentions a very nearly successful attempt to import the Bambara into Germany, where it is said that a colony of this bee would be worth £50.

The fourth species of Ceylon bee is the *Kana Veyiya*, a tiny bee belonging to the Trigonæ. This insect produces only a small quantity of honey, of rather an acid taste, which is used in native medicine. The combs are about 4 or 5 inches in circumference, and are built in the hollows of trees, crevices of rocks, buildings,

&c. The wax is dark-coloured and softer than ordinary bees wax. The bee is stingless.

So much for the different species of bees found in Ceylon. Now we come to consider about the cultivation or management of bees. The first thing necessary to be done in the formation of an *apiary* is the providing of a stock of bee-hives. As to the form and the materials out of which hives should be made opinions differ very widely both in theory and practice. In England hives made of either straw or wood have always been found the most profitable for bee-keeping, but those who wish to observe the movements of the bees employ glass hives or hives provided with glass-windows. Hives made of wood are neat in appearance and more durable than straw ones, but it is said that unless they are protected from the sun, the combs are liable to get melted and fall off. Earthenware hives are said to be in use in Turkey and Greece, and in our own country, as my readers are aware, a useless earthen pitcher or pot is the only hive provided for a swarm of bees to settle in.

The form of the hive may be of any shape, but it is important that there should be sufficient room provided for building combs, &c.

At the Fairfield Apiary, Mount Barker, Australia, where they have more than 200 hives, the hive in use is the "Standard Langstroth," an American pattern, simple in construction and producing good results.

(To be continued).

NOTES FROM A TRAVELLER'S DIARY.

The country beyond Wahakotte is comparatively free from hills, and the villages are scattered irregularly amidst vast forests of timber trees. Each village has its own tank and grove of coconut palms close to which the dwelling houses are built.

On my visit to the famous rock-cave at Dambulla, my attention was drawn to the continual drip of water into the cave from a crevice in the rock. The water appears to be of the purest description, and is collected in an earthenware vessel left for the water to drip into. This water is reserved for the use of the priests.

Palugaswewa, where I made a halt, is about 20 miles from Dambulla. The village has its tank and a large tract of paddy land; but owing to a prolonged drought I found the tank dry, while the fields had been uncultivated for 3 or 4 years. From this place the Ritigala rock, reported to have been the Sanitarium of the Native Rajas who reigned in Anuradhapura, is visible. The summit of the rock is said to be occupied by some ruins as well as by the King's Garden.

I touched at a place called Andiyagala, where I heard for the first time of the experimental cultivation of potatoes in the North-Central Province. The schoolmaster of the place first experimented with potatoes on a very modest scale. He took only a single tuber, and having divided it into four sets, planted them during the rains of December. The plants came up well, and after 4 months, tubers to the weight of half-a-pound were dug up. The soil is rich in these parts, but the great want is rain. Arrowroot ought to be grown very successfully here, but up to now paddy and kurakkan are the only crops cultivated by the natives.

At Palugaswewa I saw for the first time the process of extracting lime from the kumbuk tree *(Terminalia glabra)*. There is no limestone from which to obtain lime in the neighbourhood, and lime is much needed for chewing with betel. About two baskets of the ash of this tree give one of pure lime. The ash is obtained by burning the stem and then sifting the residue to remove any impurities that may be mixed up with it. Next a paste is made by mixing the ash with the juice of the Hinguru plant *(Acacia concinna)*, and also that of the keliya *(Irewia microcos)*. The paste is dried into balls, or cakes like cabin-biscuits and burnt in a heap of dry cowdung either by placing in coconut shells or after wrapping in plantain leaves. The heaps of dung are sometimes made so large that they continue to burn for over 8 hours. The residue from this second burning is put into hot water where it remains for several hours. The water is afterwards poured off and the residual is lime. This lime is mostly used for chewing with betel-leaf, but in one place I actually found a house whitewashed with it.

THE CULTIVATION OF TOMATO.

(Lycopersicum Esculentum.)

By W. A. De Silva.

The tomato or the love-apple is a native of America, and was introduced to Europe at an early period; from Europe its cultivation as a garden product has extended to the Eastern countries.

It is at the present day grown to a large extent in Southern Europe as the climate is favourable there; and as the demand is great both for daily use and the manufacture of preserves it has become a paying crop.

The tomato is one of the common foreign vegetables grown in Ceylon both in the lowcountry and the cold hilly districts. The demand is fairly large, as all classes are fond of this fruit.

There are a great number of varieties of the tomato, known under different fancy names which are given to them by gardeners, and particularly by seedsmen; but the varieties which can be grown with advantage in Ceylon are those known as "the large red," "the yellow," and the "red currant." The last-named variety bears small oblong fruits, and the plants are hardy, grow well and produce abundantly, the only objection to this variety is the smallness of the fruit.

The first two varieties, the red and the yellow, grow well and also produce good crops. These two varieties are generally the favourites of the cultivators.

There are also varieties of tomatoes producing very large fruits, for instance 'the giant red' producing fruits weighing from 4 to 6 lb., but such varieties are not adopted for general growth as they produce very few fruits.

In the cultivation of the tomato the seeds have to be first put in a nursery. It is very important to test the germinative properties of the seed by growing a few first, and then putting down a quantity to obtain sufficient plants.

A flower pot or some vessel filled with fine earth and well-rotten dung would form a suitable nursery. After sowing the seeds they should be kept in a place not exposed to vertical rays of the sun. The nursery should be daily watered and weeded. The plants will be ready for putting down in the land, in three or four weeks.

The land should be well prepared by weeding, digging and levelling, and holes should be made three feet apart for the ordinary variety. These holes might be manured with well-rotten dung, ashes, &c. Care should be taken not to apply unfermented manure in the cultivation of tomatoes as such manure has a tendency to spoil the crops. The young plants should be carefully planted in these holes and watered daily when there is no rain. As the plants are growing the land should be carefully weeded, and the earth near the roots should be loosened once a week or so. When the plants grow to the height of about one and a half to two feet, sticks ought to be planted around them, so that they may grow erect.

A dressing of manure as before should be applied, when the plants have grown for a month or six weeks in the garden. In two months they show signs of flowering. All plants should be pruned above the third branch of flowers so as to obtain good fruits. The side shoots should always be suppressed and a single stem aimed at. The pruning and the suppression of the side shoots preserve materials which otherwise would be wasted in the formation of useless leaves and stems, for the formation of fruit.

The application of liquid manure to the plants at the fruiting stage helps to increase the crops. Liquid manure for this purpose may be advantageously prepared from any dung, or a mixture of dung and bone dust. In order to prepare the liquid manure, the dung should be kept in a vessel, with as sufficient water to keep it in a semi-liquid state for two or three days, so that it may ferment. A pound or two of dung thus prepared may be mixed with a can of water and applied to the plants.

It has also been found that a dressing of saltpetre mixed with earth applied to the plants makes them bear well. A pound of saltpetre reduced to powder and mixed with dry earth is sufficient for applying to a hundred plants.

The tomato, like all other plants, is subject to disease, and it is a pitiable sight to see a plant which was vigorous the previous day, drooping all its leaves and dying off, with flowers, buds, and young fruits on it. This occurs owing to an excess of moisture in the land. With well drained gardens and the occasional loosening of the soil to remove the excess of moisture this could be prevented.

As a food product the tomato is well known, while it is also believed that it possesses certain medicinal properties.

WAYS AND MEANS.

No insect can live under the application of hot alum water. It will destroy red and black ants, cockroaches, spiders, bugs, and a whole host of others. Take two pounds of alum and put it in three or four quarts of boiling water; let it stand over a slow fire until the alum is all dissolved, then apply it with a brush while nearly boiling hot to every part of shelves, closets, &c., where you suspect vermin to harbour.

A mixture of copperas and glue will protect trees from rats and mice.

Half-a-pound of Paris Green or London Purple to fifty gallons of water is sufficient. It needs to be kept stirred while being sprayed, otherwise the poison will sink to the bottom, as neither dissolves in water except to a slight degree.

The French say that when a large onion is planted by the side of a rose tree in such a manner that it shall touch the root of the latter, it increases the odour of the flowers. The roses thus produced will have, they say, an odour much stronger and more agreeable than such as have not been so treated, and the water distilled from those roses is very superior to that prepared by means of ordinary rose leaves.

The green ears of maize or Indian corn form a most delicious vegetable. The cobs should be plucked just as the styles, that elegant silky-looking appendage to the ears are beginning to turn brown and wither. The corn is then of a delicate cream colour. The cobs are stripped of their covering and boiled for about three quarters of an hour, and eaten with a little butter, pepper, and salt.

Tobacco water for killing insects, &c., is made by putting a pound of tobacco into four gallons of boiling water, and placing the vessel over a slow fire where the water will continue warm for some time.

Plants cannot live indefinitely deprived of their leaves. Hence preventing their appearance above the surface will kill them sooner or later.

Plants have greater need for their leaves, and can be more easily killed in the growing season than otherwise. Cultivation in a dry time is most injurious to weeds and beneficial to crops.

Avoid the introduction of weeds in manure or litter from weedy surroundings.

After a crop has been reaped, instead of allowing the land to grow up to weeds it is often well to sow some crop to cover the ground and keep them down.

Give every part of the farm clean cultivation. If the ground is kept well occupied with other crops, weeds will give much less trouble.

Keep meadows and roadsides well weeded.

THE POULTRY YARD.

By Aba.

Poultry Keeping and Management.

The advantages of poultry keeping are very great, as most of my readers know, and if one has the time to take good care of fowls, they can be made as profitable as any other business. It is, however, very foolish to suppose that immense profits could be made by keeping fowls, and those who have started with this idea in mind have very naturally met with disappointment and given up poultry-keeping in disgust.

In poultry-raising as in many other kinds of business, a strict attention to details is necessary in order to insure success. The poultry-keeper

must take an interest in his fowls; he must be on the look-out to see what they lack in the way of comfort, and supply that lack; he must be thoughtful for them. A thoughtless, careless person is less likely to succeed in this business than in many another.

There are few households, except in the most densely-populated parts of our towns where a greater or lesser number cannot be kept with advantage and profit. I do not advise my readers to keep fowls under conditions rendering life a misery to the poor creatures, and a discomfiture, if not a positive danger to the health of their owners as is sometimes attempted; but in connection with a great number of town houses, room can be contrived for a few.

Fowls in confinement require more care and attention than those that have their liberty, and in those cases overcrowding should be specially guarded against. In small runs the number of birds kept must be limited in accordance with the available space, but where they have an unlimited range a much greater number may be kept, and at a cheaper rate, as they find for themselves much necessary food when allowed to roam about, but even here overcrowding under the most favourable circumstances must be avoided for fear of bringing on contagions disease as chicken cholera, &c.

Perhaps the greatest blunder the ambitious poultry-raiser can make is trying to raise too many fowls. Because a farm contains a hundred acres, the owner may think that he cannot overstock it with poultry, and so try to raise from five hundred to one thousand fowls. Where fowls have unlimited range they will go quite a distance in search of insects. About a quarter of a mile, however, is the limit of their wanderings, and when fowls are left to their own inclination they will separate in flocks of perhaps a dozen to each flock. This should teach us a lesson. We can learn many lessons from nature, and in their natural state fowls never move in large numbers while foraging, and would not at any other time if they could have their own selection of roosting places. But the owner thinks to economize in space and material, and will crowd a hundred into one house, and then wonder why they get sick.

Poultry-raising on a large scale will not succeed from year to year on a small area. Even on a large farm each flock of twenty-five fowls should have its separate roosting-place. They will manage for themselves during the day if allowed their freedom. Plenty of range is absolutely necessary to the well-being of fowls, all the advice to townspeople to keep a few fowls to the contrary notwithstanding. Fowls may do well awhile in a cramped city cot, but time will prove that it cannot be successfully continued from year to year. Besides, the keeping of poultry in cities only adds much more impurity to the air where too much cleanliness cannot exist if we have any regard for human healthfulness.

HEREDITY AND SEXUALITY.

According to M. Kiener of Haute-Alsace, heredity influence is controlled by two factors—the parents whose characters are transmitted to the offspring, and the environment, which aids in moulding or modifying the latter. As an instance of the influence of environment is mentioned the difficulty of replacing a local race or breed by an imported one. The imported stock becomes gradually modified and assimilated in character to the local race, though by the exercise of care and selection on the part of the breeder the original characteristics may be preserved. It is inexpedient, thinks M. Kiener, to mate together large sires and small dams, whilst it is beyond question that the use of small sires upon large dams has yielded excellent results. Many examples are quoted to show that neither of the parents enjoy a monopoly in the transmission of characters. In other words the offspring may derive its peculiarities from either parent, or from both parents. Thirty years' observation has convinced M. Kiener that the milking propensity, for example, is quite as transmissible through the male as through the female line, and, in view of the large number of offspring of one bull as compared with those of one cow, he argues that the milking aptitude is preferably propagated through the male. He adds that bulls of good dairy character are distinguished by the possession of fairly developed teats. Ancestral influence is undeniable, though under what combination of circumstances it is most likely to manifest itself it is difficult to say. The influence of the male in close in-and-in breeding is of the highest importance: and many striking instances are given in proof of this statement. For the transmission of hereditary disease it is not necessary that more than one of the parents should be the medium. The experience and observations of many years has led M. Kiener to the conclusion that it will never come within the capacity of the breeder to control the sex of the offspring, though some consider that more than one circumstance can be made to rule the sex and cite instances in proof of their theories. The age of the parents does not appear to M. Kiener to exercise any influence on the sex, and he considers that the more robust parent does not necessarily determine the sex.

The progress of the study of Embryology has placed beyond doubt the circumstance that in the animal kingdom the bisexual or hermaphrodite condition is the usual and primitive state, the unisexual condition being the result of more or less suppression of the one kind of sexual apparatus in favour of the other, which consequently developes the more fully. The embryos of vertebrate animals are first hermaphrodite—a condition which is very commonly permanent among invertebrates, and is occasionally more or less so in the case of vertebrates. In plants hermaphroditism is the rule—the unisexual condition the exception.

If the proportions of the sexes at birth be taken as a standard, it is found that normally the two sexes about balance each other in case of the human species and the domesticated animals, though with a slight preponderance of males. Statistics of the European countries give an average of 105 boys to every 100 girls. According to the observations of M. Cornevin (Professor at the Veterinary School at Lyons) the ratios in the case of farm animals are:—Horses 101 males per 100 females, cattle 104·6 males, sheep 115·4, pigs 104·9. Change in the environment appears to be one of the most potent causes in the determination of sex, and, as regards the human race, observations on this point are easily made. In hot

countries to which white people have migrated there is a preponderance of girls at birth. Horses equally serve to afford evidence that, in an environment different from their native one, there is an excess of female births.

The results of the observations of M.M. Kiener and Cornevin, as given in their papers on this subject, and reproduced in the *Royal Agricultural Journal*, strongly support the statements given on their authority in this note.

GENERAL ITEMS.

Attention is being prominently called to an alleged cure for Pleuro-pneumonia, which has already been tried and found effective. This cure was discovered by a Mr. Dawson, who argued that as Pleuro was caused by a species of microbe infesting the lungs, and as paraffin oil was found very effective in destroying minute pests which infest vegetation, it might also be equally effective in destroying microbes in the lungs. Mr. Dawson solved the difficulty of getting the paraffin oil "sprayed" over the lungs by putting a small sponge saturated with oil into one nostril of the affected animal, and holding the other nostril tight, and at every inspiration of the beast he gave the sponge a squeeze. The plan proved quite successful, and in every case resulted in the cure of the animal. The system has been tied in a large number of cases in different localities and always proved a complete cure, the result being testified by veterinary authorities. The whole facts in connection with the discovery will be brought before Parliament shortly, so that this most simple and inexpensive cure may be fairly and thoroughly tested.

A new and enlarged edition of Miss Ormerod's work on insects, entitled "Injurious Insects and Methods of Prevention" has been lately published. The volume is tastefully got up, and is illustrated by a portrait of the distinguished authoress whom one Agricultural Journal designates "the queen of Entomological Science." Simpkin, Marshall & Co. are the publishers, and the book is priced at five shillings.

Dr. Babcock, an American chemist, has discovered a new method of estimating the amount of fat in milk. The new plan consists in putting equal quantities of milk and sulphuric acid into a test bottle having a long narrow neck. The bottle is then placed on a wheel which revolves at the rate of six to eight hundred times per minute. In the course of six minutes the fat of the milk which has been set free by the acid will have risen to the top. Some hot water is then poured into the bottle, so as to fill it up to a certain point; and after other two minutes whirling at the same rate, the cream will have again risen to the top, and its percentage can be read on the graduated neck of the bottle.

A new college farm has been established in the north of Scotland where all the branches of agriculture will be taught—the instructors being all members of one family. These consist of Mr. Ledingham, senior, who will be assisted by his eldest son who studied at the Edinburgh University, and is at present a lecturer at the Tamworth College, his youngest son trained in America, and by his daughter who is an adept in dairying.

Paddy occupies an area of 1,272,100 acres this year in the Madras Presidency, a little under the normal area. Cotton is cultivated over 71,300 acres, Indigo 14,200, and Gingelly 339,200.

According to analyses made by Dr. Barry, Government Analyst at Bombay, buffalo's milk has 18·67 per cent total solids, that of the Indian cow 12·88, that of English cows 13·20. The fat in the milk of the three varieties of animals respectively, were, 7·78, 2·87, and 3·82 per cent. The difference was also borne out in the results of butter-making, and goes to show how valuable the buffalo is as a butter and *ghee* producing animal.

As to the soil for grapes, *Food, Home and Garden* says:—"The old idea that grapes thrive best on light land is mainly due to the fact that such soils are naturally dry. While a heavy clay is not best for the grape, it is no insuperable obstacle to success in vineyarding, provided it be thoroughly underdrained. In fact, grape growing is possible under a wider range of conditions and soil than is the case with any other crop. The one thing that the grape roots cannot abide is stagnant water. No matter if this dries out in midsummer, it is then past the power of the vine to regain lost time. Land thoroughly drained to the depth of three feet warms quickly and makes a difference in temperature of five to ten degrees or more at the time when the vine most needs warmth."

According to the *American Agriculturist*, a sandy loam is the best soil for sweet potatoes, and well-rotted stable manure the best fertilizer.

By reservation of forest-land and the restricting on cattle grazing the Madras Government thinks that it is doing its best to eliminate deteriorated cattle, and render the conditions of life easier for cattle of stronger growth. A fee is charged for each head of cattle admitted to the forest reserves.

According to the *Indian Agriculturist*, the study of elementary agriculture has been much attended to in primary schools in the Central Provinces of India during the past year. School gardens are to be established for the boys to learn the industry practically. Both these plans have formed part of the policy of the late Director of Agriculture in Ceylon in the appointment of Agricultural Instructors.

The leaves of *Daboisia Hopwoodii*, a shrub growing in Australia, which are chewed by the natives in the same way as tobacco is chewed, bid fair to be a rival to tobacco. The leaves of this tree contain an alkaloid piturine which is identical or closely allied to nicotine. At least it has been proved that the actions of nicotine and piturine are in every respect identical.

Erratum.—In October number, the title of first article should be "Liquid Manure."

SCHOOL NEWS.

Mr. H. W. Green, late Director of Public Instruction and the founder of the Colombo School of Agriculture, has been confirmed in the appointment, in which he has more than once acted, of Assistant Colonial Secretary; and Mr. Cull, late Principal of the Royal College, succeeds him as Director of Public Instruction. In spite of Mr. Green's translation to another department, where he will have more than enough to occupy his time and attention, we doubt not he will maintain his interest in the cause of agricultural education in Ceylon, and the success of the school with which his name will always be associated.

Mr. J. S. De Saram is back again in Colombo in the capacity of Commissioner of the Court of Requests, the duties of which he fulfilled with so great satisfaction on a previous occasion.

Mr. H. D. Juanis, who passed out of the school last year, has been appointed Agricultural Instructor of the unfortunate Walapane district, the condition of which the Assistant Government Agent of Nuwera Eliya is doing all he can to improve.

Among the subjects discussed at the Agricultural Improvement Society was the much written about "Need of Technical Education in Ceylon," the subject of a paper read by Mr. W. A. de Silva. At the last meeting five new members, unconnected with the school, were elected.

Mr. Jayasinghe, an old boy of the school, has settled down as a sugar-cane planter in the Southern Province. He has already planted up 100 acres, and intends opening about the same extent of land with the object of extending the cultivation of the cane.

The final examination for the Seniors, as well as the Junior class examination, comes off about the 15th of the month; the distribution of prizes and certificates will follow at the end of the month; and the long Christmas holidays begin from the 1st December.